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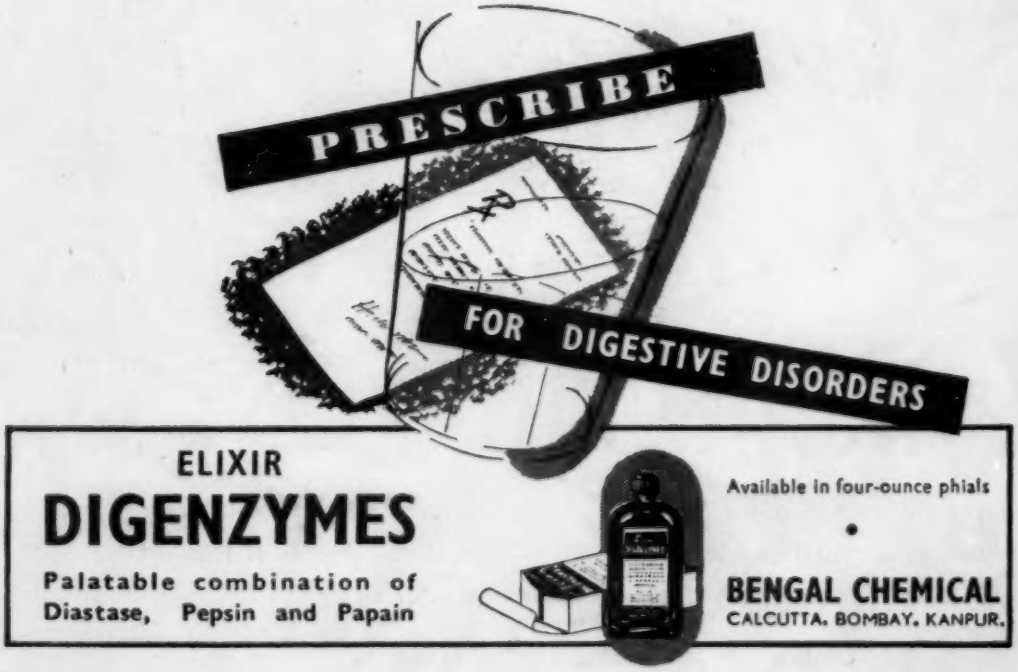

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1. La Caille, R.A., and Prigot, A.: Fourth Annual Symposium on Antibiotics, Washington, D.C., October 1956.
2. Winton, S.S., and Chesrow, E.: Antibiotics Annual 1956-57, p. 55

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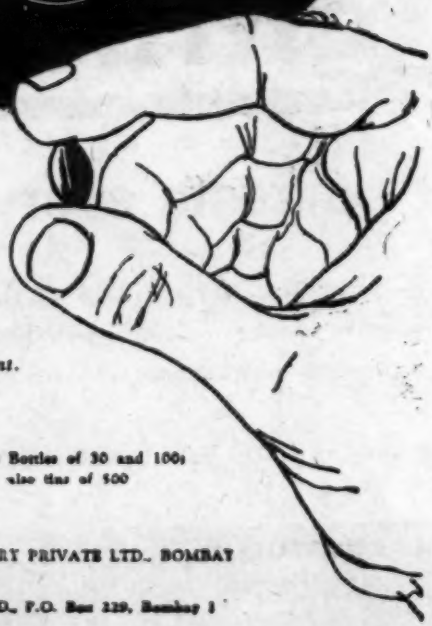

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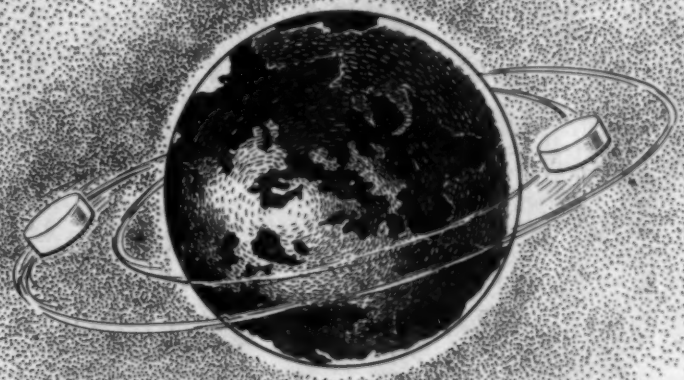

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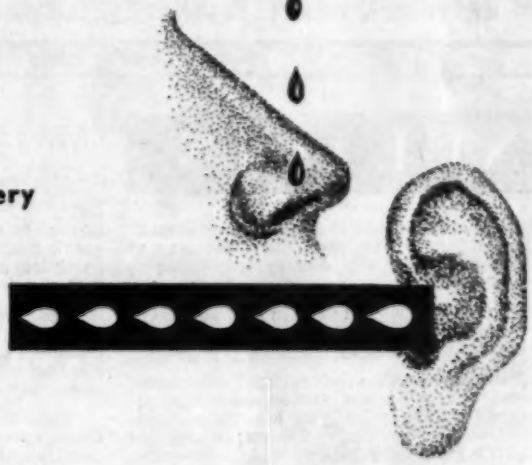

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The Control of Gastric Acidity
Brit. Med. J., 26th July, 1952, 2 : 180-182

Discussion on Peptic Ulceration
Proc. Roy. Soc. Med., May, 1953, 46 : 354

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Clinical Investigation into the Action of Antacids
The Practitioner, July, 1954, 173 : 46

Ambulatory Continuous Drip Method in the Treatment of Peptic Ulcer—
Amer. J. Dig. Dis., March, 1955, 22 : 67-71

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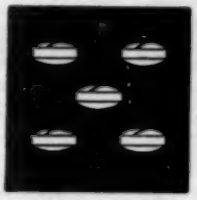

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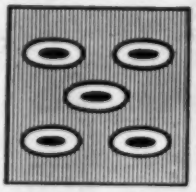

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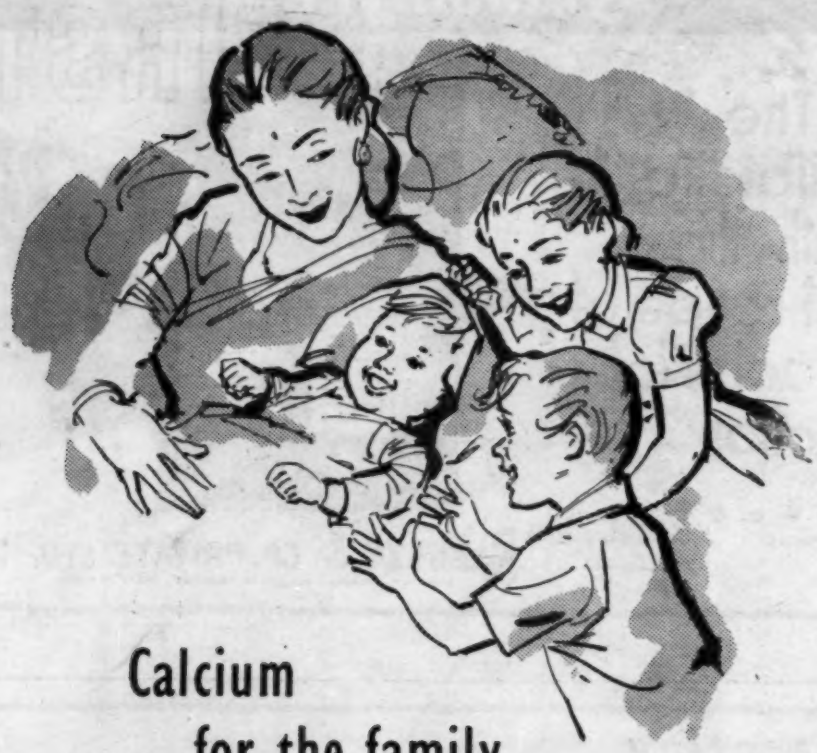

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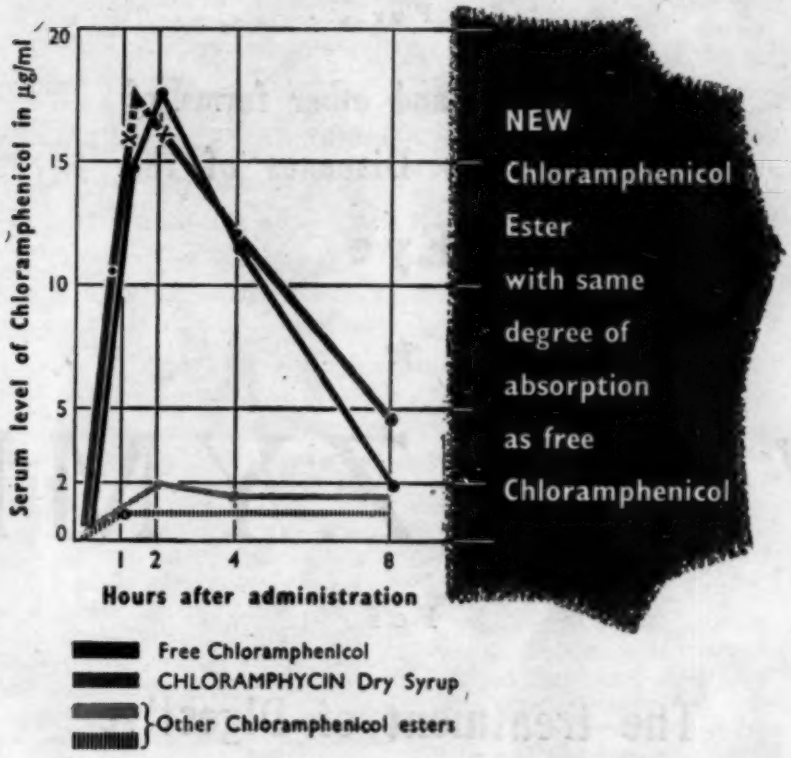

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Journal of the Indian Medical Association

VOLUME 30 NUMBER 11 — PUBLISHED TWICE A MONTH — EDITOR—P. K. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.) — CALCUTTA JUNE 1, 1958

ORIGINAL ARTICLES

PREPARATION OF AN ADSORBED VACCINE FOR TYPHOID, CHOLERA AND DYSENTERY*

S. P. GUPTA, M.D., DIP. BACT., N. P. GUPTA, M.D., DIP. BACT.

Department of Pathology and Bacteriology, Lucknow University

AND

K. S. MULLICK, M.SC.

Lucknow

There is a general acceptance regarding the feasibility of immunisation against a number of bacterial infections with combined vaccines (Fleming, 1949; Hazra and Habbu, 1956). The main objections, however, against the whole organism vaccines are that they cause local and general reactions and require more than one injection for immunisation. Further, they contain a variety of components that produce antibodies devoid of protective power. Attempts have, therefore, been made from time to time to prepare soluble antigens, a single injection of which may induce an adequate antibody response, without producing any toxic symptoms.

Gefen (1945) prepared a combined vaccine containing chemically fractionated antigens of typhoid, cholera and dysentery bacilli and reduced its toxicity by adsorbing them on calcium phosphate. D'Alessandro *et al* (1954) used purified O and Vi endotoxins of *S. typhi* emulsified in mineral oil and showed that a single injection produced both agglutinating and protective antibodies and was non-toxic.

An attempt has been made by the authors to prepare a vaccine containing soluble antigens from *S. typhi*, *S. paratyphi A*, *Shigella dysenteriae*, *Shigella flexneri*, and *Vibrio cholerae*, to adsorb them on calcium phosphate and study their immunising properties. The results obtained are described in the present communication.

METHOD AND MATERIALS

BACTERIAL POWDER :

About 200 rolled papain-digest-agar bottles were seeded with young culture of the organism. After 48 hours incubation at 37°C., the growth was washed off with sterile 0·85 per cent saline. The washing from each bottle were tested for purity and the pure washings pooled and centrifuged in a Sharples centrifuge. The bacterial mass, thus obtained in the bowl, was washed with saline, treated with alcohol, and finally dried in a vacuum desiccator.

PREPARATION OF THE ANTIGENIC FRACTIONS :

Aqueous extract—The aqueous extract was obtained by grinding 10 g. of the alcohol-acetone dried bacteria (or 50 g. of wet bacteria) with 300 ml. of distilled water in a glass pestle and mortar. It was kept at a temperature of about 6°C with occasional shaking. The suspension was then centrifuged at about 10,000 r.p.m. The supernatant was filtered through a Seitz filter.

* This work was carried out under a grant from the Council of Scientific and Industrial Research.

Sodium acetate extract—It was prepared like the aqueous extract. The distilled water contained 5 per cent of sodium acetate and 3·5 per cent of acetic acid.

Diethylene glycol extract—The dried bacterial powder (or the moist bacteria) was extracted with diethylene glycol (Morgan, 1937).

Trypsin digest—The dried bacterial powder was digested with trypsin (Raistrick and Topley, 1934).

Trichloracetic acid extract—The dry bacterial powder was extracted with trichloracetic acid, (Boivin and Mesrobeanu, 1933; Kabat and Mayer, 1948). Neutralisation, when necessary, was done with a solution of sodium hydroxide.

ADSORPTION TECHNIQUE:

To 40 ml. of the extract or polysaccharide solution was added 5 ml. of 10 per cent sodium phosphate. To the mixture was then added 5 ml. of 10 per cent calcium chloride drop by drop with constant stirring. The precipitate of calcium phosphate was collected, washed once and resuspended in one-fourth of the original volume of distilled water.

TESTS FOR ANTIGENICITY:

Both unadsorbed bacterial extracts and those adsorbed on calcium phosphate were injected subcutaneously into rabbits. The titre of antibodies was determined by the agglutination test.

AGGLUTINATION TESTS:

Alcoholised suspensions were used for O agglutination of Salmonella and Shigella, and formalised suspension for H agglutination of Salmonella and for O-agglutination of *Vibrio cholerae*. Sera from treated rabbits were serially diluted with 0·85 per cent saline, starting from 1/20 to 1/5120. To each dilution was added an equal volume (0·3 ml.) of the antigen suspension. The readings for 'H' agglutination were taken after incubation at 50°C. for 2 hours and for 'O' agglutination after further incubation at 37°C. overnight. The maximum dilution, showing visible agglutination to the naked eye, was taken as the end point.

Results

Salmonella typhi—The results (Table 1) for *S. typhi* show that aqueous and diethylene glycol

TABLE 1—SHOWING SALMONELLA TYPHI ANTIGENS

Antigens	Amount injected	Rise in temp. in °F.	'H' agglutinin titre* Weeks 1	2	3	4	'O' agglutinin titre* Weeks 1	2	3	4
I. TRICHLORACETIC ACID EXTRACTS										
No. 1 ...	1 mg.	Nil	0	20	40	80	640	320	320	160
No. 1 adsorbed	4 mg.	0·8	20	80	160	80	320	320	160	160
No. 1 adsorbed	1 mg.	Nil	80	160	320	160	2560	640	320	320
No. 2	1·0 ml.	1·2	160	320	320	160	20480	10240	5120	2560
No. 2 adsorbed	1·0 ml.	0·2	160	320	320	160	2560	1280	640	640
No. 2 adsorbed	0·25 ml.	0·4	40	80	40	20	2560	1280	640	640
II. TRYPSIN DIGESTS										
No. 7 ...	1 mg.	2·2	0	0	0	0	640	640	320	160
No. 7 adsorbed	1 mg.	0·4	0	0	0	0	80	—	80	—
No. 7 adsorbed	16 mg.	0·6	0	0	0	0	320	—	80	—
No. 8 ...	1·0 ml.	2·0	80	40	Died	—	2560	1280	Died	—
No. 8 adsorbed	0·25 ml.	0·2	160	80	40	10	1280	640	320	160
III. AQUEOUS EXTRACTS										
No. 9 ...	1·0 ml.	0·8	20	10	10	10	320	320	160	160
No. 9 adsorbed	1·0 ml.	0·2	20	10	10	0	80	40	20	0
IV. DIETHYLENE GLYCOL EXTRACTS										
No. 15 ...	1·0 ml.	1·0	80	40	20	10	640	320	80	40
No. 15 adsorbed	0·25 ml.	Nil	0	0	0	0	0	0	0	0

* Figures represent reciprocal of end-titres.

Antigen Nos.: 1—A 1 mg/c.c. solution of an alcohol precipitated antigen from a dialysed trichloroacetic acid extract of wet bacteria, 2—Neutralised trichloracetic acid extract of dried bacteria, 7—F 68/60 (dried bacteria), 8—Digest concentrated in vacuo (dried bacteria), 9—Extract (dried bacteria) and 15—Extract (dried bacteria).

extracts stimulated the production of agglutinins in small quantities but the adsorbed extracts did not. The trichloracetic acid extracted antigen was more antigenic than the trypsin digest-antigen. The neutralised trichloracetic acid extract also gave a good response. The titre of O agglutinins went up to 20,480 in one animal. The adsorption of the antigen on the calcium phosphate was equally good with both the extracts.

Salmonella paratyphi A—The results (Table 2) show that diethylene glycol did not extract any antigens. The aqueous and sodium acetate extract stimulated the production of H antibodies only. The trypsin digest and the trichloracetic acid extracts produced both H and O antibodies, but with the trichloracetic acid extract the titre of O antibodies was higher. The results obtained with antigen No. 17, 17A, and 19 show that the treatment with alkali had some adverse effect on the antigenic property.

TABLE 2—SHOWING SALMONELLA PARATYPHI A ANTIGENS

Antigen Nos.	Amount injected in ml.	Rise in temp. in °F.	'H' agglutinin titre* Weeks 1	2	3	4	'O' agglutinin titre* Weeks 1	2	3	4
I. TRICHLORACETIC ACID EXTRACTS										
17	1·0	2·0	640	1280	640	160	320	320	160	80
17A	2·0	1·2	80	160	80	20	0	0	0	0
17B	1·0	2·2	80	80	20	10	40	40	20	0
17 adsorbed ...	1·0	0·6	10	0	0	0	0	20	0	0
17 adsorbed ...	0·25	0·4	10	—	10	0	0	0	0	0
19	1·0	4·0	40	80	80	40	40	40	20	10
19 adsorbed ...	1·0	0·8	80	40	20	0	0	0	0	0
II. TRYPSIN DIGESTS										
23	1·0	2·4	640	1280	640	320	40	20	0	0
23 adsorbed ...	1·0	0·6	640	1280	640	640	0	0	0	0
23 adsorbed ...	0·25	0·6	160	160	80	40	0	0	0	0
III. AQUEOUS EXTRACTS										
27	1·0	3·6	320	320	160	160	20	10	10	0
27 adsorbed ...	1·0	0·4	1280	1280	640	320	0	0	0	0
27 adsorbed ...	0·25	0·4	2560	1280	640	160	0	0	0	0
27A (readsorbed) ...	1·0	0·4	640	320	320	80	0	0	0	0
27A (readsorbed) ...	0·25	0·6	320	160	160	80	0	0	0	0
IV. SODIUM ACETATE—ACETIC ACID EXTRACTS										
28	1·0	1·8	80	80	20	Died	0	0	0	—
29 adsorbed ...	1·0	0·4	40	160	320	80	0	0	0	0
29 adsorbed ...	0·25	0·4	320	160	40	20	0	0	0	0
29A (readsorbed) ...	0·25	0·6	40	20	40	20	0	0	0	0

* Figures represent reciprocal of end-titres.

Antigen Nos.: 17—Extract dialysed (moist bacteria from the Sharples bowl), 17A—Solution of antigen No. 17 treated with an equal volume of decinormal NaOH and then neutralised, 17B—Extract F/68 dialysed (moist bacteria from Sharples bowl), 19—Extract neutralised (dried bacteria), 23—Digest (moist bacteria from the Sharples bowl); 27—Extract (moist bacteria from the Sharples bowl), 27A—The supernatant from the adsorbed antigen No. 27, readsorbed with calcium phosphate, 28—Extract (undialysed), 29—Antigen No. 28 dialysed and adsorbed and 29A—The supernatant from the adsorbed antigen No. 29A readsorbed.

Vibrio cholerae—The results (Table 3) show that the various extracts were weakly antigenic. As the neutralised extract was non-antigenic, it appears that the addition of alkali had an adverse effect on the antigen. The antigenicity of adsorbed vaccines was not satisfactory. Diethylene extracts were non-antigenic.

Shigella—The results (Table 4) show that the diethylene glycol and trichloracetic acid extracts from *Shigella dysenteriae* type I were antigenic. When the distilled water in which the dialysis was being carried out was injected in the rabbits, it stimulated the production of agglutinins in low titre. This would indicate that some of the antigens had diffused through the cellophane membrane. The dialysed extract gave a good response but prolonged dialysis ultimately completely removed the antigenic value.

TABLE 3—SHOWING VIBRIO CHOLERAE ANTIGENS

Antigen Nos.	Amount injected in ml.	Rise in temp. °F.	'O' Agglutinin titre* Weeks 1	2	3	4
I. TRICHLORACETIC ACID EXTRACTS						
5	... 1·0	2·4	80	40	20	0
6 adsorbed	... 1·0	0·6	10	10	10	0
7	... 1·0	1·6	0	0	0	0
9	... 0·75	2·4	10	40	20	20
9 adsorbed	... 1·0	0·4	0	20	20	10
II. AQUEOUS EXTRACTS						
11	... 1·0	1·4	80	80	80	40
12	... 1·0	1·4	160	160	80	20
12 adsorbed	... 1·0	0·8	80	320	160	80
13	... 1·0	1·2	80	160	80	10
III. TRYPSIN DIGESTS						
15	... 1·0	0·2	40	80	80	40
16	... 1·0	1·6	160	80	20	0
16 adsorbed	... 1·0	0·8	0	20	0	0
17	... 1·0	2·0	80	40	40	20
17 adsorbed	... 1·0	1·0	40	20	20	10
IV. SODIUM ACETATE, ACETIC ACID EXTRACT						
19	... 1·0	1·6	160	160	80	20
20 adsorbed	... 1·0	0·6	20	20	20	10

* Figures represent reciprocal of end-titres.

Antigen Nos.: 5—Extract dialysed (moist bacteria), 6—Extract dialysed (moist bacteria), 7—Extract neutralised (dried bacteria), 9—Extract neutralised (moist bacteria), 11—Extract (moist bacteria), 12—Extract (moist bacteria), 13—Extract (dried bacteria), 15—Digest (moist bacteria), one volume alcohol precipitate, 16—Digest concentrated in vacuo (moist bacteria), 17—Digest concentrated in vacuo (moist bacteria), 19—Extract (moist bacteria) and 20—Extract (moist bacteria) adsorbed on calcium phosphate.

TABLE 4—SHOWING SHIGELLA DYSENTERIAE ANTIGENS

Antigen Nos.	Amount injected	Rise in temp. °F.	'O' Agglutinin titre* Weeks 1	2	3	4
I. DIETHYLENE GLYCOL EXTRACTS						
1	... 1·0 ml.	0·8	160	80	40	20
2	... 1·0 ml.	0·8	320	160	Died	
1 diffusate	... 5·0 ml.	0·4	80	40	40	20
II. TRICHLORACETIC ACID EXTRACTS						
6	... 1·0 ml.	1·8	640	640	320	160
6 adsorbed	... 0·25 ml.	1·0	80	40	0	0
7	... 1·0 ml.	1·6	40	80	40	0
9	... 0·9 mg.	1·6	0	0	0	0

* Figures represent reciprocal of end-titres.

Antigen Nos.: 1—Extract dialysed, 2—Sintered glass filtrate (undialysed), 6—Extract dialysed 24 hours, 7—Extract dialysed 33 hours and 9—Extract dialysed (100 hours) and precipitated with alcohol.

TABLE 5—SHOWING SHIGELLA FLEXNERI ANTIGENS

Antigen Nos.	Amount injected in ml.	Rise in temp. °F.	'O' Agglutinin titre* Weeks 1	2	3	4
TRICHLORACETIC ACID EXTRACTS						
1	... 1·0	2·4	1280	1280	640	160
2	... 1·0	1·4	...	80	40	40
2 adsorbed	... 1·0	0·6	320	160	80	40
TRYPSIN DIGEST						
5	... 1·0	1·0	160	320	160	40
5 adsorbed	... 0·25	0·2	160	80	20	10

* Figures represent reciprocal of end-titres.

Antigen Nos.: 1—Extract dialysed (16 hours), 8—Extract dialysed 32 hours) and 5—Digest concentrated in vacuo.

In the case of *Shigella flexneri* type I (Table 5) the trypsin digest antigens produced antibodies to a low titre. The dialysed trichloracetic acid extract, however, gave a good antigen producing antibodies to a titre of 1,280 but when the period of dialysis was prolonged from 16 hours to 32 hours, the resulting antigen produced antibodies to a titre of 80 only.

DISCUSSION

The use of adsorbed vaccines for eliminating the need for a second dose and for reducing the toxicity and pyrogenicity of the antigens is well known. Adsorbed typhoid vaccines prepared from autolysates of bacteria were used by Wolters *et al*

(1950), Mazur (1951), and Mazzettii (1954). The main problem in preparing such a vaccine was the production of an antigen in a soluble form which could be antigenic and protective after adsorption to an innocuous substance.

In our experiments it was possible to prepare the soluble antigens of good antigenic value from *Salmonella typhi*. The soluble antigens prepared from *S. paratyphi A*, Shigella, and *Vibrio cholerae* did not have satisfactory antigenic value. The antigens from the Shigella and Vibrio group diffused out through the cellophane membrane. Basu *et al* (1940) reported that rabbits could be immunised with cholera culture diffusate against a challenge dose. Similar results were observed by Burrows (1944).

For preparing an adsorbed vaccine we have used only calcium phosphate. The adsorbed vaccine, with antigens of *S. typhi*, was effective in producing antibodies. Agglutinating antibodies were not produced by adsorbed vaccines of Shigella and Vibrio. The pyrogenicity of the vaccine was also tested. It was noted that, with *S. typhi* adsorbed vaccine, there was hardly any local reaction and the rise in temperature was not more than 1°C. when an effective dose was given for the production of antibodies.

Regarding the problem of protective antibodies, preliminary experiments with small number of mice (6 in each group) indicated that with a challenge dose of *S. typhi* the adsorbed vaccine offered good protection. Similar experiments conducted on mice with adsorbed vaccines of *S. paratyphi A*. *Shigella dysenteriae* and *Vibrio cholerae* indicated that they did not offer any protection.

Summary

Soluble antigens of *S. typhi*, *S. paratyphi A*, *Shigella dysenteriae* and *Vibrio cholerae* were pepared by extracting with water, trichloracetic acid, trypsin and diethylene glycol. They were adsorbed on calcium phosphate and their antigenicity was tested by injecting in rabbits.

An adsorbed vaccine was possible with antigens of *Salmonella typhi*. The results with *S. paratyphi A*, *Vibrio cholerae* and Shigella organisms were not satisfactory.

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THE AGE OF MENARCHE IN GUJARATI COLLEGE-GIRLS

K. A. SHAH, M.B.B.S.

Chief Medical Officer, Gujarat University
Ahmedabad

The institution, by the Gujarat University, of a compulsory medical examination for the new entrants to the University, affords a good opportunity for the collection of many useful data. The questionnaire which the students have to fill up includes a few questions about the menstrual history which the girl students have to answer.

The questions are as follows:

1. Have you started menstruating? 2. At which age did menstruation commence? 3. What is the interval between the periods? 4. How long does the flow last? 5. Is the flow normal, scanty or excessive? 6. Do you suffer from any pain, nausea or vomiting at the time? 7. Do you experience any weakness after the period?

More than two thousand such histories have accumulated during the last three years, the analysis of which yields valuable information (Table 1).

A preliminary report on the age of menarche as obtained from the scrutiny of 970 histories was published earlier (Shah, 1955).

The frequency of distribution according to age is shown in Table 2.

TABLE 1—SHOWING THE RESULT OF ANALYSIS OF THE ANSWERS

Total No. of girls	2391 (All Hindus)
Average age of menarche ...	14·88 years
Flow :	
Duration	5·2 days
Interval	29·72 days
Quantity :	
Average	93·48 per cent
Excessive	5·64 per cent
Scanty	0·88 per cent
Incidence of dysmennorhea and/or other symptoms	26·6 per cent
Weakness after the flow	18·97 per cent

TABLE 2—SHOWING AGE OF ONSET OF MENARCHE

No. of girls	Age of onset	Per cent
3	11	0·12
28	12	1·20
171	13	7·15
610	14	25·50
937	15	39·20
512	16	21·41
108	17	4·51
17	18	0·71
5	19	0·20

There were 114 Parsis and 51 Muslims. As their number was small, only the average age of menarche is mentioned here for the sake of comparison :

	Age of menarche
Parsis	14·23 years
Muslims	14·04 years

DISCUSSION

We will now compare these figures with those from other countries and places.

Table 3 gives 13·63 years as the age of menarche for Indians. This information is based on observations of Curjel (1920) quoted by Modi (1955). Only 489 observations formed the material.

Information collected from 989 girls of Maharaja Sayajirao University during 1950, 1951, 1952 gives 13·8 years as the age of menarche (Personal communication). A similar report on 2370 girls of high schools in Poona during 1954 gives 14·06 years.

TABLE 3—SHOWING AGE OF MENARCHE IN OTHER COUNTRIES

Country	Number	Age in years
Scotland	10,219	15·037
Russia	10,000	15·242
Italy	31,659	14·968
Norway	206	14·57
Holland	1,800	13·75
Germany	11,550	15·7
Germany (another investigator)	1,742	14·4
Austria	1,763	13 to 13·5
Poland	3,667	15·2
India	489	13·63
Brazil	2,707	14·17
Korea	424	15
China	2,924	14·073
Japan	6,354	14·3
Japan (another investigator) ...	1,172	14·2
Arctic Zone	624	14·6
Temperate Zone (Europe) ...	500	12·6
England	12,247	15
France	7,887	14·6
Spain	1,025	18·2
Temperate Zone (North America)	10,531	13·9
South Asia (18-23 North) ...	1,140	12·9
True Tropical Zone ...	1,593	15·8

TABLE 4

Country or town	Age of menarche
Swedish Lapland ...	18 years
Oslo	16 years 9 months 25 days
Berlin	15 years 7 months 6 days
Manchester	15 years 6 months 23 days
Lyons	14 years 5 months 29 days
Madeira	14 years 3 months
Deccan	13 years 3 months
Calcutta	12 years 6 months
Akhmyn (Egypt)	10 years
Sierra Leone	10 years

Factors influencing the age of menarche—"The earliest available material led us to suppose that climate and especially temperature were the main factors in retarding or hastening the first menstrual period. According to Sushrut, menstruation generally began in girls at the twelfth year in Hindustan ; the Talmudist Rabbis gave 13 as the more frequent year when referring to the Jewesses of Asia minor, and Soranus of Ephesus gave 14 as the usual age for Roman girls . . . ." (Ploss *et al*). Haller (1757) was the first among moderns to suggest that as we go further north, menstruation is retarded, and accelerated in the tropics. For a considerable time, medical men accepted Haller's view as correct. Tilt (1862)

confirmed the preponderant climatic influence, and from various statistical data he concluded that the average age for the onset of menstruation in hot climate is 13 years and 16 days; in temperate climate, 14 years 4 months 4 days; and in cold climate, 15 years 10 months 5 days. Krieger (1869) compiled a tabular synopsis of towns and countries according to mean annual temperature rising from cold or temperate to tropical as shown in Table 4.

But there is no agreement among authorities on the influence that climate has on the onset of menstruation. I have given below, in chronological order, some excerpts to indicate the confusion and chaos that exist in this field.

1. Playfair (1876) states, "As a rule, it occurs somewhat earlier in tropical and later in very cold than in temperate climates. The influence of climate was formerly unduly exaggerated."

2. On the other hand, Galabin (1903) maintains, "The influence of climate is considerable, and in hot countries menstruation commences, on the average, about two years earlier, while it is at the same time more profuse. In Arctic climates, on the other hand, its appearance is delayed to about an equal extent, and the quantity of blood lost is very small."

3. Jellet wrote in 1903, "In these countries puberty as a rule, occurs between the ages of thirteen and sixteen. In hot countries, on the other hand, it comes on at an earlier date and in cold countries at a later."

4. Eden and Lockyer (1920) inform us, "Under the various climatic conditions found between Hudson Bay and the Gulf of Mexico, this writer (i.e. Englemann) found very little variation in the time of onset of menstruation. From Englemann's observations it appears that climate is of less importance than race, and the often expressed opinion that in cold countries women begin to menstruate later than in hot countries cannot be maintained."

5. Here is the opinion of a renowned physiologist. "The age at which this phenomenon occurs shows many individual variations, but the average for temperate climates is given usually at 14 to 15 years. In the warmer countries the age is earlier, 8 to 10 years, and in cold regions somewhat later, 16 years. The racial characteristic in this respect is said to be maintained, however, after generations of residence in countries of a different climate, as is illustrated by the relatively early appearance of menstruation among Jews even in the colder countries." (Howell, 1923).

6. The 1924 edition of the famous text-book of the Diseases of Women by Ten teachers states, "The age at which menstruation begins depends rather upon racial characteristics than upon climate, but in general is earlier in warm than in cold climates, although this dependence upon climatic conditions does not always follow."

7. "The age at which the first menstruation appears varies in different races and under different environments. Climate has long been thought to influence the beginning of menstruation—the colder the climate the later the first menstruation. This holds good as a general rule, the Laplander beginning to menstruate at about eighteen, while the inhabitant of hot climates at from nine to eleven." (Crossen & Crossen, 1935).

8. The renowned anthropologist Hooton (1949) is of the opinion that ". . . . . the mean age of menarche in a world wide sample is not far from 15 years . . . . . It seems necessary to abandon the idea that onset of menstruation is closely related either to climate or race."

9. Mazer and Israel (1951) are of the opinion that "Climate is also an important factor, the temperate zones being conducive to an earlier menarche."

10. Shaw (1952) tells us that menstruation begins between the ages of 10 and 12, whilst amongst the Esquimaux the average age of puberty is 23.

11. On the contrary Novak (1952) writes, "Climate probably plays a much less important part than was formerly believed. Investigation has shown that there is little difference between the age of menstrual onset in such northern races as the Esquimaux or Laplanders as compared with, for example, such southern races as the Italians. Race would seem to be more important than climate, as certain races such as the Jews appear to mature earlier than others."

12. As recently as in 1955, it is said, "There is no doubt that the menarche occurs at an earlier age in eastern countries such as India, and while racial and climatic differences play their part, it is probable that racial tendencies may to some extent be modified by climatic environment. Western children will mature earlier in the East but will do so at a later age than nations of the country." (MacLennan (1955).

The reader will appreciate the uncertainty that exists in this field. Equally conflicting are the statements about the racial factor in the onset of the menarche. Eden and Lockyer (1920), Howell (1923), and Novak (1952) among others, attach some importance to the racial factor, whereas Hooten (1949) and Crossen (1953) believe that race has no influence on the menarche. The latter writes, "The importance of race was investigated by Michelson. In a study of White and Negro girls, he concluded that socio-economic circumstances were much more important than race in the differences found. Similar conclusion was reached by Schaeffer in a study of Gentiles and Jewesses, hence race is probably not a significant factor in the variations in the onset of the menarche."

In the paragraph first quoted, socio-economic conditions have been mentioned. Bensenger (1882) who studied 5611 women of different social strata in Moscow found that the girls of the upper classes menstruated between 9 and 12 years; the middle class ones between 13 and 16; and the poorest between 17 and 22. On the contrary, Lintz and Markow (1923) who investigated the histories of 800 women from different economic, social and racial strata came to the conclusion

that environmental conditions have little to do with the onset of menstruation, but that "heredity plays a very important role." Crossen and Crossen (1935) also hold a similar view. They believe that "the personal inherited tendencies about which we know very little, but which exercise a marked influence on the phenomena of life" also play their part. Gould and Gould (1932) found that the age of the menarche in mothers affects the age of onset in their daughters, and that the age of onset of menstruation in the daughters studied, correlated with the age of menarche in their sisters. Furthermore, there is a striking consonance in the menarcheal age of twins (Petri, 1934). Fink (1954) studied 25 monozygotic twin pairs and found that there was a high degree of agreement in respect of the menarche, between the two members of the pairs.

Early sexual experience is said to hasten the menarche. Tarnowsky (1889) studied 150 prostitutes in Leningrad and found that 45·99 per cent had their first period between 11 and 15, while from the normal girls of the same district only 10 per cent were so precocious. This precocity, however, was not invariable. Moreover, in communities where child marriage is frequent, such a phenomenon does not occur.

We thus see that though the age of menarche is affected by many factors, it is difficult to say which is more important and which less. Fluhmann (1956) admits that "The factors which control the age of menarche are many in number and insufficiently understood, but the most significant appear to be proper nutrition and healthy living conditions." One may easily agree with this, but scarcely with his other statement that "the age of menarche is an index of the degree of civilization and well-being of the people of all countries."

Trend towards an earlier menarche?—An opinion prevails that during the last century there is a definite trend towards an earlier onset of the menarche. Mazer and Israel (1951) write, "A world decrease in the age at menarche has become apparent during the last generation, probably because of the higher standards of hygiene and diet which induce better growth and development. Statistics drawn from questioning middle-aged women compared with those derived from questioning young women, show a difference of at least one year in the age at menarche." Fluhmann (1956) has shown from various sources that in U.S.A. the average age of menarche was 14·2 in 1901, 13·6 in 1921, 13·1 in 1932 and 12·9 in 1948. Figures for England also show this trend. For example, 15 years is given as the age or menarche (1903), in 1950 the average age of menarche is reported to be 13·49 (Wilson and Sutherland, 1950). In Copenhagen the age of menarche was 16 years 9 months in the nineteenth century (Krieger, 1869), in 1955 it is found to be 13·75 years (Bojen *et al*, 1955).

But figures for our country do not bear this out. Krieger's (1869) table gives 12 years 6 months for Calcutta and 13 years 3 months for Deccan; Curjel (1920) gave 13·63 years and our figure is 14·88 years. If there is any trend, it is in the reverse direction!

A more fruitful method of comparison is that of percentage distribution, as given in Table 5.

TABLE 5—SHOWING PERCENTAGE DISTRIBUTION OF THE CASES

Age in years	India 1929*	Gujarat (present series) %	Baroda %	Poona %	England† %
11	2·0	0·12	0·53	0·39	0·3
12	10·4	1·20	3·78	4·03	22·4
13	36·4	7·15	16·70	20·45	36·6
14	29·3	25·50	38·02	39·27	24·1
15	13·9	39·20	26·79	26·16	8·3
16	4·5	21·41	11·45	7·91	0·8
17	2·2	4·51	2·31	1·51	0·2
18	0·2	0·71	0·42	0·22	—
19	0·04	0·20	—	0·06	—

* Report of the Age of Consent Committee in India (1929), quoted by Ploss *et al*.

† Annual Report of the School Medical Officer, 1945. (The figures are for 1940. There were a few cases below 11 also, e.g. 1 at age 8, 1 at 9 and 11 at 10 years.)

A comparison of the 1929 figures for India with our present series shows that there is a definite shift towards a later menarche. A second noteworthy point is that nowhere in Gujarat, Baroda or Poona had any girl menstruated before the age of eleven, whereas figures for England show that one out of a thousand had started menstruation at eight years, one at nine and eleven at ten years. These figures do not bear out the statement of Howell (1923) that "In the warmer countries the age is earlier, 8 to 10 years. . . ." or that of Galabin (1903) ". . . . variations between the tenth and twenty first years are not very rare . . ." or of Crossen and Crossen (1953) that "The menarche may occur in normal girls as early as six years."

CONCLUSION

From the material presented the author is led to conclude that heredity perhaps plays a major part in the onset of menstruation and the two principal environmental factors, viz., (1) Climate and (2) Socio-economic conditions including diet, hygiene

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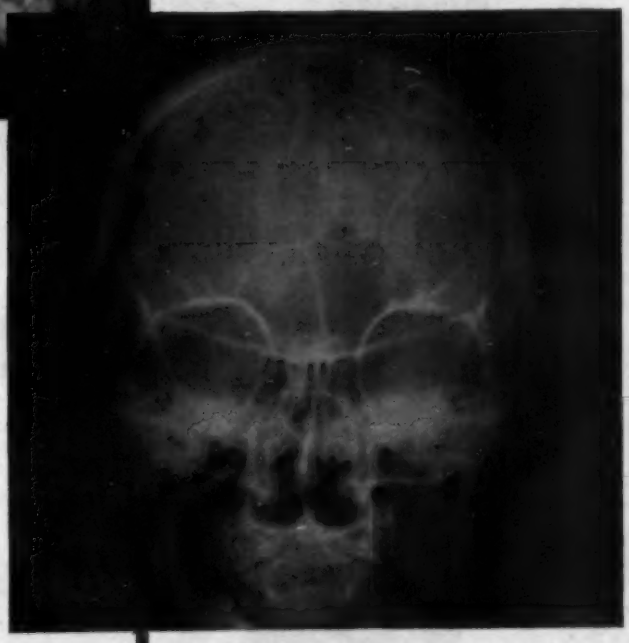

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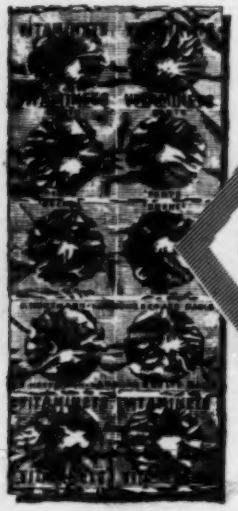

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and other things play a part opposite to each other, and perhaps cancel or mitigate each other's influence.

ACKNOWLEDGMENT

I am grateful to the authorities of the Gujarat University for permitting me to use the material presented.

ADDENDUM

Chitale (1957) has put the age of menarche as 14·40 in 98 Gujarati girls studying in Poona High School, 13·73 years in 100 Parsi girls and 14·12 years in 129 Mahammedan girls. Her figure for 1,139 Maharashtrians is 14·25 years. The author quotes Purandare as giving 13·6 years for Bombay girls and Parvatidevi as giving 13·79 years for Madras girls.

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USE OF CORTISONE IN THE COMA OF CEREBRAL INFARCTION

P. L. DESHMUKH, M.D. (BOM.), D.T.M.H. (LOND.), F.C.P.S. (BOM.), F.A.C.C. (U.S.A.)

Department of Medicine

B. J. Medical College and Sassoon Hospitals

Poona

INTRODUCTION

Acute episodes of cerebral infarction either from thrombosis or embolism are commonly encountered in practice. However, till recently, their treatment was of a rudimentary nature.

With the introduction of new potent drugs and better understanding of the physiopathological processes occurring in the affected portion of the brain consequent on infarction, the therapeutic horizon has brightened, and now there is no more justification for the placid attitude of the profession towards these episodes.

Acute infarction indicates sudden loss of blood supply usually to a small part of the brain. This alone is insufficient to account for the deep coma. It is now recognised that coma is due to sudden onset of cerebral oedema after the infarction impairing the blood supply of a large part of the brain and recovery is due to clearing of the oedema and the improvement in the cerebral circulation.

Three zones of affection of tissue in the brain can be recognised after an infarction. The central zone is the area of necrosis of brain tissue whose blood supply is completely and directly cut off by the occlusion of a vessel. This is surrounded by a more extensive area which is rendered ischae-

mic by vasoconstriction and gross cerebral oedema that supervenes consequent on the sudden occlusion of the vessel. At the periphery there may be a narrow zone of normal cerebral tissue.

The gross abrogation of cerebral function precipitating as coma is really due to the extensive oedema and the resulting ischaemia of the brain. If the blood supply can be promptly increased to this area, the tissue reaction can be avoided and the function of the brain can be early restituted.

Here, then, is the key to the rational and positive treatment of cerebral infarction. Attempts have been made to improve the cerebral circulation by producing vasodilatation in the affected part by use of drugs like priscol, aminophylline, nicotinic acid, papaverine, and by blocking the stellate ganglion.

Anticoagulants have been tried to prevent extension of thrombosis but were discarded because of the risk of haemorrhage in the softened area.

We were disappointed with the use of vasodilator drugs in this condition. Our results with stellate ganglion block (Deshmukh, 1951) were encouraging though not very impressive. A recent report on the use of cortisone (Russek *et al*, 1955) in this condition gave us the incentive to try the therapy in our cases of cerebral infarction.

Two important actions of cortisone seem to be useful in the treatment of this condition. The anti-exudative action diminishes the flow of fibrinous fluid from the capillaries and thus tends to control the cerebral oedema. Inhibition of mesenchymal tissue reaction may save the nerve cells of the second or ischaemic zone from death by lack of oxygen. The composite effect of both these actions is the diminution of the cerebral oedema and minimising the irreversible neurological damage by salvage of the anoxic nerve cells in the ischaemic zone.

Material and Methods

We treated 4 cases of clinical cerebral infarction. The age of the patients ranged from 52 to 74. All the patients except one were male. The treatment generally was started 48 hours after the coma had set in and after conventional treatment was given a trial during the period. So, by the time the treatment was undertaken the coma was fairly deep. It is incumbent that the supportive measures should be rigorously maintained during the period of impaired consciousness. These consist of regular feeding by nasal tube, attention to bladder and bowels, skin, nasal and buccal secretions, eyes, nose, posture and locomotor system.

Dosage—As the patients were unconscious it was preferred to give cortisone parenterally 100 mg. three times a day, subcutaneously, for the first three days. As the consciousness returned, the dose was reduced to 100 mg. twice a day for the next 2 days, then 50 mg. twice a day for 3 days and 25 mg. twice for the next 3 days. Later, one tablet twice a day by mouth for a fortnight may be given. Attention should be paid to the usual contraindications to the use of cortisone. The therapy may be supplemented with insulin if there is gross glycosuria as a result of cortisone administration. It is necessary to keep the patients on low salt regime during the treatment and to administer potassium chloride 1-2 g. orally per day.

Results

All the cases showed dramatic improvement 24 hours after the commencement of treatment with cortisone. The first favourable sign was the gradual return of consciousness. It generally took three days for the patient to recover enough to speak a few simple words. There was a remarkable change for the better in the mental and emotional status of the patient. Those who were still stuporose, somnolent or apathetic, became alert and bright very rapidly on the treatment. There was a general sense of well being. This effect is perhaps due to the action of cortisone to produce euphoria. Together with the improvement in the mental condition, there was less pain in the afflicted extremities on passive movement and their range of movement appeared to be improved. Since the cortisone therapy was started 48 hours after the patients had been on conservative line, the improvement after the therapy cannot be called spontaneous, and since similar results were obtained in all the four cases, they cannot be called fortuitous.

Discussion

Our results with cortisone in cerebral infarction were impressive. A report (Dyken and White, 1956) on controlled series has been published demonstrating that 'cortisone was of no benefit' to such patients and further that "cortisone may be a dangerous drug to use in cerebrovascular diseases." At present, we can unhesitatingly recommend its use in similar conditions.

Summary

Value of cortisone therapy in the treatment of coma due to cerebral infarction in four cases is discussed.

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PRACTITIONERS' SERIES

THE INVESTIGATION AND TREATMENT OF CONGENITAL CYANOTIC HEART DISEASE*

REEVE H. BETTS, M.D.

Department of Thoracic Surgery
Christian Medical College Hospital
Vellore, S. India

Who could have envisioned the startling advances in the field of surgical treatment of congenital cardiovascular lesions that has followed the first successful interruption of a patent ductus arteriosus by Gross in 1938 (Gross and Hubbard, 1939)? The most dramatic part of this chronicle began with the publication in 1944 by Blalock and Taussig (1945) of their ingenious method of attack on the problem of congenital cyanotic heart disease. Up to that time it was thought that some of the simple non-cyanotic lesions might be benefited by surgical treatment, but to propose an elective major surgical operation on an intensely cyanotic child seemed hardly credible. Although the Blalock-Taussig operation does not cure the patient with congenital cyanotic heart disease, it produces a major improvement in a high percentage of cases and it is this contribution that has spurred on other investigators, so that now one seems quite justified in assuming that surgical treatment, and even cure, may be available for many more congenital cardiac lesions in the near future.

It is obvious that surgical science is on the verge of a break-through and it will not be many years before the more intricate heart abnormalities may be safely treated with the use of a substitute "heart-lung preparation". Such machines are now being used in many centres around the world. The difficulties have not been completely surmounted and the most acceptable type of artificial heart has not been decided, but the rapid progress towards solution of the remaining problems indicates that it is only a matter of time.

Basic Considerations

There are various fundamental cardiac abnormalities that can produce visible cyanosis, but the majority are due to a mixing of the blood from the two circulations and usually this is at the ventricular level. A plain ventricular septal defect, however, does not lead to cyanosis as the pressure in the left ventricle is usually higher than that in the right ventricle and the blood flows consequently from left to right. The same is true of the uncomplicated auricular septal defect. Should some associated lesion or an additional complication produce an elevation of the pressure on the right side of the circulation, the shunt of blood may be reversed and unoxygenated blood from the right side of the heart then becomes mixed with the oxygenated blood on the left side which is then pumped into the systemic arteries and cyanosis becomes clinically manifest. What are the factors that can reverse this shunt from the normally occurring left to right and cause the blood to flow from right to left? Primarily, there are two causes, one, such as is found in the tetralogy of Fallot, is a high degree of obstruction in the pulmonary outflow tract. This may be either at the valvular or infundibular level and in rare cases in the pulmonary artery itself. Due to this obstruction, the right ventricle increases the pressure in an attempt to force the blood through the obstruction, but as soon as the pressure in the right ventricle reaches or exceeds that in the left ventricle, then the blood of the two circulations becomes mixed and cyanosis appears.

In the tetralogy of Fallot there is another factor contributory to the mixing of oxygenated and unoxygenated blood and that is the dextroposition of the aorta. In other words, the aorta is shifted to the right so that it overrides the ventricular septum, and blood from the right ventricle can enter the aorta directly without going through the ventricular septal defect into the left ventricle first. How great a factor this overriding is cannot be stated categorically and most likely it is not of serious importance as the recent experiences indicate that the degree of overriding is usually not so severe as to prevent closure of the ventricular septal defect under direct vision.

If the communication between the two circulations is at the auricular level, then what can cause a reversal of flow here and produce cyanosis? The two most common causes are increased pressure in the pulmonary circulation as in pulmonary hypertension or a failing right heart with an increasing pressure in the right auricle.

How these principles usually work is demonstrated by the patient with the classical Eisenmenger complex. In this lesion there is a ventricular septal defect with no stenosis in the pulmonary outflow tract. Thus such patients are not usually cyanotic at birth or in early childhood. The shunt is from left to right, but this means that the right side circulation, including the lungs, is subjected to higher than normal pressures. In response to these pressures and consequent pulmo-

* Based on a paper read at the Madura District Medical Society in March, 1958.

nary hypertension a resistance develops in the pulmonary vessels. As this progresses the pressure in the right ventricle increases as the heart tries to overcome the obstruction and as resistance in the pulmonary vessels becomes higher and the right ventricle begins to fail, due to the excess work, back pressure increases so that the pressure in the right circulation becomes higher than that on the left and the shunt then becomes right to left and cyanosis develops. Many of these patients carry on in childhood without great difficulty, but about the time of puberty increasing symptoms develop and cyanosis either first becomes manifest or becomes more marked at this time.

There are other less common lesions that also produce cyanosis, such as transposition of the great vessels, truncus arteriosus, pseudo-truncus arteriosus or abnormal venous return to the heart, but they will not be discussed here as they are of comparative infrequency and can usually be diagnosed with certainty only in the larger centres with complete investigative facilities. Patients with an auricular septal defect may also have mild to moderate degrees of cyanosis if the shunt becomes reversed from right to left. This is usually found only in the later stages of the disease and is not expected in infancy or early childhood.

Tetralogy of Fallot

Fortunately, about 75 per cent of the patients with congenital cyanotic heart disease will be found to have the complex known as the tetralogy of Fallot. These patients have a ventricular septal defect, overriding at the aorta and an obstruction in the pulmonary outflow tract. In two-thirds of them the obstruction is infundibular and in the other third valvular. The fourth factor, right ventricular hypertrophy, is a purely compensatory manifestation, due to the heavy workload imposed by the pulmonary outflow obstruction. The lesion could be more correctly termed trilogy of Fallot.

Patients with the tetralogy of Fallot commonly are cyanotic from birth or early infancy. Any exertion such as crying or an upper respiratory infection which increases the work of the heart results in increased cyanosis. In the more severe cases, exertion may bring on syncope due to cerebral hypoxia. Because of the unsaturation of the peripheral blood, the number of red blood cells and the circulating blood volume increase, so that the level of the blood haemoglobin, the red blood cell count and the circulating blood volume are markedly elevated. The increased viscosity of the blood may lead to cerebral thrombosis with consequent neurological manifestation.

Types—The cases of tetralogy of Fallot may be divided into several groups as has recently been suggested by McCord *et al* (1957). This division is based on the relative severity of the ventricular septal defect and the pulmonary stenosis. The classical tetralogy of Fallot is that found in the more or less balanced group. In most cases tetralogy of Fallot patients are normal mentally but are slow in development and growth when compared with normal children. After any exertion they typically assume a squatting position until compensation is regained. This is quite characteristic of a tetralogy of Fallot patient but is seldom found in patients with some other congenital heart abnormality.

Physical examination shows the obvious cyanosis with clubbing of the digits and suffusion of the conjunctivae. Often there is a precordial bulge but not gross cardiac enlargement. A thrill may or may not be palpable over the third or fourth left intercostal space. On auscultation a systolic murmur is most often present. It is of interest that the loudness of the murmur may be in an inverse proportion to the severity of the patients' signs and symptoms, that is, those with the loudest murmur may be less incapacitated than the ones with a faint murmur as apparently in the more severe degrees of pulmonic stenosis not enough blood passes through the outlet to produce any but the faintest murmur on auscultation. The pulmonic second sound is soft or absent and is usually not split.

There is one condition that may be easily confused with the tetralogy of Fallot and that is tricuspid atresia with hypoplastic right ventricle and auricular septal defect. This combination of abnormalities means that for all intents and purposes the patient has only a single ventricle and there is in addition a shunt from the right to the left at the auricular level. On x-ray examination these patients, as a rule do not show any of the cardiac border to the right of the vertebral column on a postero-anterior exposure. Also, the E.C.G. instead of having a right axis deviation shows left axis deviation. These two factors being in contrast to those found in the tetralogy of Fallot tend to differentiate the two conditions. Although both the tetralogy of Fallot and tricuspid atresia with hypoplastic right ventricle are helped by the shunt type of operation it is well to make the diagnosis preoperatively as the tricuspid atresia group are not quite as good risks and the prognosis in these cases has to be a bit more guarded.

The x-ray examination of the heart in the tetralogy of Fallot cases shows a rather characteristic configuration as there is a marked hyper-

tophy of the right ventricle due to the obstruction of outflow in the pulmonary tract. This right ventricular hypertrophy tends to lift up the apex of the heart and give it a rounded cantour which, in association with the small pulmonary artery shadow characteristically found in this condition, produces a sheep-nose configuration which has been termed "coeur en sabot" or a "sheep-nosed" heart. In conjunction with this characteristic shape of the heart there is also a decreased vascularity of the lung fields due to the pulmonary hypotension. The findings of the characteristically shaped heart with decreased lung vascularity in a cyanotic child is almost diagnostic of the tetralogy of Fallot.

Electrocardiographic examination reveals a marked right ventricular hypertrophy and right axis deviation in the tetralogy of Fallot cases and in some there may be a strain pattern. The exception to this is as noted above in those patients who have tricuspid atresia and hypoplasia of the right ventricle. Here there is practically no right ventricle to give any potential and consequently the child shows a left-axis deviation. This is, therefore, in striking contrast to the findings of the ordinary tetralogy of Fallot patient.

Laboratory examinations of the blood are not of diagnostic significance in separating out the various congenital cyanotic heart lesions as all patients with congenital cyanotic heart disease should show an increased haemoglobin determination and increased red blood cell count and packed cell volume. As the degree of difficulty may vary in all these different lesions, the level of cyanosis and the compensatory changes in the blood picture also vary and are not of any differential diagnostic significance.

Difficulty may be encountered in those cases of congenital cyanotic heart disease that do not exhibit all the classical symptoms of the tetralogy of Fallot or tricuspid atresia as enumerated above. In this group will be found many of those patients in the late state of Eisenmenger's complex, auricular septal defect with pulmonary hypertension and a right to left shunt as well as those with truncus arteriosus and patent ductus arteriosus with reverse flow. Patients with classical truncus arteriosus usually are extremely incapacitated in early infancy and may be differentiated from most of the tetralogy of Fallot cases by the severity of symptoms and rather rapid deterioration. Also the x-ray figuration of the heart is apt to be different from the tetralogy of Fallot especially with a narrowing of the base of the heart. Patients with auricular septal defect and reverse flow due to pulmonary hypertension in most instances are not in the younger age group, but only those that have had the lesion for a number of years and who have developed a high degree of pulmonary resistance. The history in these cases will separate them from the tetralogy group. Those with partial abnormal venous return of the heart may be more difficult to separate as they often will have a moderate degree of cyanosis with comparatively less disability. In the more extensive degrees of abnormal venous return there is a characteristic alteration of the cardiac shadow which assumes the shape of a figure 8 which is usually found when there is complete anomalous venous return. This condition is, of course, compatible with life only when some other intracardiac lesion compensates for the abnormal venous return from the lung. Patients with a patent ductus arteriosus and reverse flow should not be confused with the tetralogy of Fallot patients in that they have a different type of murmur in a different location and here again the cyanosis is practically always a late sign and is not found in early childhood. The shape of the heart is different because the increased load at the beginning is on the left side of the heart and the right ventricle becomes hypertrophied only later on. The vascularity of the lung field is increased in this condition as it is in most of the patients with auricular septal defect and also with the Eisenmenger's complex.

Ancillary Procedures

In spite of all the differentiating features of the patients with the various types of congenital cyanotic heart disease there still remains a group of patients which do not clinically fit into any of the above mentioned categories with certainty and it is for this group that the more extensive diagnostic procedures need to be employed. The two most frequently used are angiocardiography and cardiac catheterization.

In venous angiocardiography a radio-opaque dye is rapidly injected into one of the systemic veins and x-ray exposures of heart and great vessels are taken as rapidly as possible during the next few seconds. Although expensive foreign x-ray machines are available that will take several exposures per second in two planes, we have not had any experience with such machines and have used a simple home-made devise that allows us to take six or seven pictures in as many seconds. This has proved to be satisfactory in the majority of cases. Angiocardiography demonstrates the path that the blood takes in going through the

Literally *coeur en sabot* means heart like a boot.—Ed., *J. Indian M. A.*

heart and lungs and it is frequently of diagnostic import. A right to left shunt will usually show up quite conclusively although a left to right shunt may not be manifest. In the usual tetralogy of Fallot patient simultaneous opacification of the aorta and pulmonary vessels together with a suitable clinical picture is usually considered diagnostic of this syndrome. It may also be useful in proving the presence or absence of a pulmonary artery on either side where surgical treatment is contemplated as it is sometimes not possible to say for certain from the plain x-ray film whether or not a pulmonary artery is present as the arteries are often so small that they do not show up satisfactorily on fluoroscopy.

A patent ductus arteriosus or coarctation of aorta is best demonstrated by a variation of the technique wherein the dye is injected in a retrograde fashion either through a carotid artery or a brachial artery. Our preference is for the latter route as this does not then offer any risk of compromise of the cerebral circulation. A polyethylene catheter can be inserted through the brachial artery into the arch of the aorta and the dye injected rapidly at this point.

Cardiac catheterisation is a safe procedure if done with proper precautions and under proper control. The electrocardiogram must be monitored at all times during the passage of the catheter as certain patients exhibit considerable irritability of the heart when the catheter is introduced. Passage of this catheter permits pressures to be recorded at various points in the right side of the circulation from the superior vena cava to the pulmonary "wedge" which is as far out as the catheter can be pushed into a small pulmonary vessel. Pressure at this point is thought to reflect quite accurately the pressure that obtains in the left auricle.

In some instances it is possible to pass the catheter through either an auricular or ventricular septal defect and in some cases the catheter is easily passed into the aorta from the right ventricle when there is marked overriding of the aorta. Often it is difficult or impossible to introduce the catheter into the pulmonary artery in the presence of very marked pulmonary stenosis. When the catheter can be introduced into the pulmonary artery in a case of tetralogy of Fallot, by carefully measuring the pressures as the catheter is withdrawn, one can determine whether or not the obstruction is valvular or infundibular. This may be of great importance in planning the surgical programme.

Both angiocardiography and cardiac catheterisation are valuable adjuncts in selected cases, but they should only be carried out by well-qualified personnel who are cognizant of the dangers involved and the measures that can be taken to minimise the risks. Also, it seems unwise to subject a patient to such a procedure unless there is the necessary adequate equipment for accurately recording the pressures that are found by an electromanometer. A simple saline manometer is not sufficiently accurate.

Probably the most valuable finding on cardiac catheterisation in the cyanotic patient is the determination of the oxygen content of various samples of blood that can be removed periodically as the catheter is introduced through the right-sided circulation. These samples are analysed at once and the oxygen content determined and compared with the oxygen content of the femoral artery blood and the oxygen capacity of the blood. By the results thus obtained one is able to determine that there is a shunt from left to right whether it be at the auricular or the ventricular level or perhaps only in the pulmonary artery through a patent ductus arteriosus.

Treatment

As all patients with congenital cyanotic heart disease have an anatomic abnormality so that the blood does not circulate in the normal fashion, they are confronted with a mechanical defect which cannot be treated, except symptomatically, by anything other than direct mechanical, surgical means. Patients with the tetralogy of Fallot may be treated either by the Blalock-Taussig procedure of anastomosing a systemic artery to a pulmonary artery to increase the blood supply to the lungs or by a direct attack relieving the pulmonary stenosis and closing the ventricular septal defect. The latter method, although theoretically a preferable one, calls for a heart-lung machine and so far even in the best of hands carries a much higher mortality rate than the less desirable, but safer, shunt type of procedure. We have had no experience with the open heart type of correction with a heart-lung machine and our treatment has been limited to the palliative procedures. As the pulmonic stenosis is the main difficulty in patients with tetralogy of Fallot, anything which increases the amount of blood supply to the lung is usually beneficial. Thus patients with the tetralogy of Fallot and a patent ductus arteriosus are better off than those that have just the straight tetralogy. It was this observation that prompted Dr. Taussig to suggest to her surgical colleague, Dr. Blalock, that an artificial ductus arteriosus be treated for those patients who had a tetralogy of Fallot. The Blalock-Taussig opera-

tion of subclavian artery, pulmonary artery anastomosis, was therefore developed. A modification of this, the Potts-Smith operation (Potts *et al*, 1946), in which the pulmonary artery is anastomosed directly to the aorta was also developed and is of use especially in those infants who are three years of age or younger and in whom the subclavian artery may not be large enough to give an effective shunt. The difficulty with the Potts-Smith operation, however, is that it is apt to result in an anastomosis that is too large. In such events the patient may go into congestive failure because of the added load imposed on the right side of the heart.

It is not to be expected that a shunt type operation, either the Blalock-Taussig or the Potts-Smith operation, will restore the patient to a normal state. The best that can be expected is an amelioration of symptoms and increased exercise tolerance rather than a state of gradual deterioration such as is the prognosis of most of these patients without surgical interference. As the surgical treatment of congenital cyanotic heart disease has been used for less than 15 years it is impossible to make a definite statement regarding the ultimate prognosis of such patients. There is no doubt that the creation of a shunt between the systemic and pulmonary circulations in some regards does throw an added burden on the heart and it is the usual thing to find some cardiac enlargement after operations. Some of the earlier cases that were done by Blalock and others have been carrying on very well and the percentage of those developing cardiac failure is small (White *et al*, 1957).

The risk of surgical treatment of tetralogy of Fallot by the Blalock or Potts type of procedure is dependent upon several factors one of which is the severity of the lesion as evidenced by the amount of cyanosis, the level of the haemoglobin and red cell count. When possible, it is better to defer operative interference until the child is four years of age or older as it is usually then possible to do a Blalock type of operation. When the operation has to be done before this age, because of severity of symptoms, a Potts-Smith operation is often necessary and we feel that the risk of this is somewhat greater than the Blalock's because of the ease with which the anastomosis can be made too large and the patient subjected to congestive failure.

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HEALTH EDUCATION

EDUCATION IN SANITATION WITH AN NDIAN COMMUNITY IN SOUTH AFRICA

GUY W. STEUART, A. MEHARCHAND J. JOHN and B. GAJADHUR

Institute of Family and Community Health
Durban, South Africa

One of the most significant characteristics of modern health and medical services, is the development of systematic community health education. Nevertheless there is still considerable and widespread doubt whether it can yield the practical results that would make it a worthwhile investment.

There does seem therefore, to be a need for as many demonstrations as possible of health education in action, which will reveal something of its effectiveness and its limitations. It is hoped that the health education programme described here, will make a small contribution to the list of such demonstrations.

The community in which this programme was carried out, consisted of 721 Indian families making up a population of 6,699. This was a comparatively long-settled community with a history reaching back to before 1900 and within it, kinship and friendship associations were both intimate and widespread. Economically a poor people of whose homes about 65 per cent were overcrowded shacks, the struggle to earn a living and to meet their daily needs constituted a serious stress factor. In spite of this, or perhaps because of it, they showed a remarkable cohesiveness as well as stability and continuity of cultural background.

To this community, the Institute of Family and Community Health, with a staff of physicians, nurses and health educators, offers a health and medical care service. This is an essentially personal health service, since the Institute is not the responsible authority for the provision of environmental services as such. But to the extent that the improvement or provision of such non-personal services falls within the scope of individual, family

or group action within the community itself, the Institute is vitally concerned.

Among other serious problems found in this community, there was a high incidence of gastro-enteritis, of dysenteries, and of hookworm and roundworm infestation, all associated with undesirable sanitary conditions and habits.

To confirm this impression, and to serve as a baseline for measuring any improvements which might be achieved, a systematic survey was conducted. The results not only confirmed the reality of the sanitary problem but suggested too that health education of the community might be able to make an effective contribution to its solution.

This survey was carried out on a random sample of 1 in 4 families, 153 families being included in the final analysis. The first two columns of Table 3 show the findings.

It will be seen that a majority of the families surveyed (81·7 per cent) had adequate sewage disposal facilities in the form either of a municipal waterborne sewage system or a pail system or of pit latrines with superstructures. The remaining families, however, had facilities that were grossly inadequate or sometimes no facilities at all. In addition, 59·5 per cent of families had latrines which overflowed, the seepage creating undesirable conditions in the immediate environs of the home while 38·6 per cent of families had latrines which showed obvious signs of soiling by faeces on the seats, floors or walls.

Moreover, children particularly, were inclined to defaecate indiscriminately and their parents did not seem to attach much significance to this practice. Thus an appreciable proportion of families (28·2 per cent) had exposed faeces in the immediate environs of their homes.

Another, though less serious problem, was that of garbage disposal. A fair proportion of families (44·4 per cent) could be said to be disposing adequately of garbage by burning, burying or using it to make compost for the garden or again, by making use of the municipal disposal service. The others, however, disposed of garbage more or less indiscriminately around the home.

It was not surprising then, that there was considerable evidence of fly-breeding throughout the community. At the same time, however, 56·9 per cent of families owned fly traps, swats or insecticides.

With regard to the adequate protection of infants' food and feeding utensils from contamination, 54·9 per cent of families adequately protected the utensils and 61·4 per cent the food, of infants under 2 years of age.

On the assumption then that at least part of the answer to the total problem was an educational one, and with the findings of this preliminary survey at hand, informal discussions were held with various representative members and groups in the community to assess the community's perception of the problem and to what extent community motivation could be harnessed to a solution.

These discussions suggested that a favourable climate existed for a programme of education in sanitation and objectives were designed to correspond with the items in the preliminary survey.

At the same time, the educational methods were planned. These were to involve two main interacting levels of group work.

Firstly, there was the more impersonal and formal level of organised secondary groups which already existed in the community and which were doing welfare work of one kind or another for the community as a whole or for particular groups within it. Secondly, there were the small informal primary groups of kin, friends and neighbours which are characteristic of all community living and which exercise such a powerful formative influence on the individual.

The health educators met both kinds of groups to discuss with them, the sanitation and infectious disease problems of the community and their possible solution.

The field education programme lasted a total of exactly 10 weeks.

During this period about 70 per cent of the primary groups known to exist at the time, were met and with them, a total of 169 informal discussions were held.

It is most important to appreciate that education was considered to be an interacting process among a number of people and not a simple didactic teaching by one person of a group. Thus use was made of learning rather than teaching situations, and people were encouraged to express their personal opinions, reach their own conclusions and make their own decisions.

There is another educational principle that ties in closely with this. The programme objectives were clearly defined in rather precise and measurable terms. For example, one objective was 'to increase the number of families with adequate sewage disposal facilities''. But the understanding and the decisions involved in enlightened personal and public action are most likely to occur where people are changing on the foundation of a broad, unrestricted acquaintance with their problems. This kind of understanding can be achieved only where education, without being tediously comprehensive, has freedom to rove over a wide range of knowledge.

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Thus effective education in sanitation cannot confine itself to certain rigidly defined areas but must, as it were, be prepared to illustrate and support its case from a diversity of sources.

It is in permissive group discussion situations where the members are free to express their needs as they feel them, that within certain limits, this broader education is realised.

These points were well illustrated in the present programme. Since it was to some extent, experimental in nature, detailed records of all discussions were kept and subsequently analysed.

Each record for example, was examined, and a count taken of the number of times topics of different categories were mentioned. These topic categories are listed in Table 1. One discussion might, for instance, have begun with the problem of hookworm, moved on to the use of medical diagnostic facilities and concluded with the dangers of indiscriminate defaecation. For this record then, there would be a count of 3 "mentions", one in the field of communicable disease, one in the use of services and one in sanitation.

Table 1 shows the results of this analysis for the discussions with primary groups. It is apparent, although the objectives of the programme are stated in terms purely of sanitary conditions, that a variety of other subjects became involved in the education. As would be expected, however, a considerable proportion (25 per cent) of this subject-matter concerned communicable disease.

TABLE 1—NUMBERS AND PERCENTAGES OF SUBJECT "MENTIONS" IN VARIOUS CATEGORIES
(169 Primary Group Discussions)

Subject categories	"Mentions" Number	Percentage
Sanitation	488	42·6
Communicable disease ...	286	25·0
Non-communicable disease ...	101	8·8
Diet	67	5·8
Mental health	9	·8
Use of services	195	17·0
Total ...	1146	100·0

Not only, however, was there reference to a wide range of subject-matter but this subject-matter was discussed in relation to a variety of social groupings. This again is what one would expect as the outcome of free self-expression of felt problems by participants in the learning situation, who would tend to relate problems to the realities of their own families and individual members of these.

Taking the same records, an analysis similar to that of subject "mentions" in Table 1 was carried out for "references" to social categories in relation to such "mentions". For example, if during the course of a discussion mention was made of the implications of the subjects being considered for the family as a whole, parents as such and pre-school children, this was counted as 3 references, one to each of these categories. Where subject-matter was discussed in principle without such reference, it was classed under a heading "No reference".

The results are shown in Table 2. It will be seen that the group to which most reference was made was the family (30·9 per cent) and this is not surprising in a service where the family unit is regarded as so important. It is also what one might expect in this particular programme where the objectives involve steps taken by the family to change the sanitary conditions of its home. At the same time, the range of social groups to which reference was made, is again an indication of the flexibility and realism of education conducted in a free discussion group.

TABLE 2—NUMBERS AND PERCENTAGES OF "REFERENCES" TO VARIOUS SOCIAL CATEGORIES
(169 Primary Group Discussions)

Social category	"References" Number	Percentage
Family	354	30·9
Parents	191	16·7
Antenatal women	137	11·9
Mothers and infants ...	89	7·8
Pre-school children	71	6·2
Older children	122	10·6
Adults	148	12·9
No reference	34	3·0
Total ...	1146	100·0

In contrast to the work with primary groups, there was considerable involvement of the more formal, organised secondary groups in the community.

During the 10-week field programme, the interest and co-operation was gained of 2 voluntary "welfare" societies, a religious organisation, a school and its staff, and a parents' association. In addition, 142 contacts were made with individual community leaders and potential leaders. A series of film shows realised a total attendance of 2183.

It is most important in health service programmes that a constant evaluation of the effec-

tiveness of the services be carried out. The present programme of health education was evaluated in terms of the extent to which the original objectives were achieved.

As was described earlier, a preliminary survey had been conducted in the planning stages quantitatively to measure the nature and extent of the sanitation problem in this community. Subsequently, the 10 weeks field programme was carried out and when this set period ended, the survey was repeated for the same random sample of 1 in 4 families studied at the beginning.

The health educators responsible for carrying out the programme assisted in this survey but by means of the allocation methods used, carried out the investigation on different families from those falling within their areas of educational work.

The findings of these two surveys are shown in Table 3. Changes were accepted as significant only where the percentage difference was 3 or more times greater than the standard error of the difference and this ratio is indicated in the final column of the table.

TABLE 3—CHANGES IN SANITATION DURING 10 WEEK EDUCATIONAL PROGRAMME (153 families)

Objectives	Before education		After education		Percentage difference	C.R.
	No.	%	No.	%		
Sewage disposal :						
Adequate facilities	125	81·7	136	88·9	7·2	1·7
No seepage ...	62	40·5	124	81·0	40·5	8·4
No soiling of latrine ...	94	61·4	140	91·5	30·1	6·6
No exposed faeces	110	71·8	135	88·2	16·4	3·7
Adequate garbage disposal ...	68	44·4	78	51·0	6·6	1·2
Fly swats/traps/ insectides ...	87	56·9	108	70·6	13·7	2·5
Adeqnate protection of :						
Infant feeding utensils ...	84	54·9	109	71·2	16·3	3·0
Infant food ...	94	61·4	113	73·9	12·5	2·4

It will be seen that the most marked changes occurred in relation to the use and care of existing latrines and that there was a failure to produce significant change in the erecting of new latrines which required time, effort and money.

There was also, no significant change with regard to garbage disposal and this may have been due to the feeling of both educators and community that this was a far less serious problem than that of sewage disposal.

In addition, no explanation could be found for the relatively poor results in attempts to increase the number of families owning fly swats, traps and insecticides and of those adequately protecting infants' food.

Taking the broad view, however, the results strongly suggest that the education carried out, stimulated changes in the direction of the programme objectives, in certain instances, to quite a marked extent. In this respect, it is perhaps important to remember that in any aspect of a health service, professional personnel may have certain relatively ideal standards which they would wish their community to achieve.

While long-term programmes may be comparatively successful in approaching these objectives, for practical purposes, we must usually be content with clear evidence, not so much of ultimate achievements but of movement in a desired direction. Once this movement is stimulated and maintained, not only are there likely to be short-term results in improved health but we have every reason to be optimistic about continued change and improvement in the future.

Of course, it may well be asked whether the changes described here may not have occurred in the normal course of community living without the special intervention of an educational programme.

Unfortunately, no control community was studied. Several years' experience, however, with this particular community and with similar kinds of surveys done in the past strongly suggest that the described changes were stimulated largely by this programme. After all, they took place in a very short period of only ten weeks. Were spontaneous changes as rapid, this community would surely, long before the date of this programme, have developed very high sanitary standards.

Of course, this particular programme was arbitrarily confined to a period of only 10 weeks community education. Under ordinary circumstances, such a programme would be relatively continuous, measures of its success being carried out periodically and yielding a report on progress rather than on a theoretically final achievement.

Whatever significance may be attached to the statistical evidence, it is of importance to appreciate that these changes are the product not of coercion on the one hand, or of high-pressure propaganda on the other. They represent the results of new perception, stimulated motivation, and voluntary decisions to act on the part of individuals and families themselves.

To this extent one would expect them to have greater permanence and at the same time to illustrate that all human communities have within themselves, and intrinsic to their culture, potentialities for developing their own health and welfare with the guidance of enlightened services.

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PUBLIC HEALTH

BIOLOGICAL VALUE, BY NITROGEN BALANCE SHEET METHOD, OF PRESSED GROUNDNUT CAKE FLOUR FED TO HUMAN VOLUNTEERS*

S. B. LAL,† M.B.B.S., D.P.H., PH.D.

Assistant Director of Public Health (Nutrition)

AND

S. P. ROYCHOWDHURY, M.SC.

Nutrition Chemist, Public Health Institute Patna

INTRODUCTION

In an early communication (Lal, 1952), it is reported that when pressed groundnut cake flour was fed to children kept on a poor rice diet there was significant increase in there height, weight and haemoglobin readings and the increase in height and haemoglobin was the same as with skimmed milk powder.

The present paper deals with the assessment of the biological value and digestibility coefficient of the pressed groundnut cake flour fed to human volunteers and its supplementing value when fed with rice or wheat diet. Further more the biological value and digestibility coefficient of the parboiled homepounded rice (medium quality) and the whole wheat flour were also assessed since literature does not indicate that such an appraisal has been made on man.

METHOD

Subjects—The experiments were carried out on five healthy adult human volunteers; they were employees of this institute and continued to do their normal work, care being taken to see that during the whole experimental period they were not put to extra or hard work. All of them were lodged in an outhouse of this institute and kept under our supervision. Food was cooked and fed in our presence. Twentyfour hour samples of urine and stool were collected for nitrogen estimation.

Experimental arrangements—The experiment was divided into six parts each lasting for seven days with an interval of the same period in between. The first part consisted of feeding them with low nitrogen diet to determine their endogenous nitrogen metabolism. After the usual rest period, during the other five parts the subjects were put on the test diets which consisted of (i) parboiled homepounded rice (medium quality), (ii) whole wheat flour, (iii) pressed groundnut cake flour, (iv) parboiled homepounded rice with pressed groundnut cake flour and (v) whole wheat flour with pressed groundnut cake flour. The protein content of the test diets in each case was kept at five per cent level. The ratio of rice or wheat protein with the pressed groundnut cake flour was 3:1. Urine sample of all the seven days of all the subjects were collected and creatinine estimated while nitrogen estimations were made on the samples of urine and faeces of the last three days only. The technique of collection of excreta and estimation of nitrogen was the same as reported by Mitra and Verma (1947).

Diets—(i) Nitrogen free—During the first part, the diet was not entirely free of nitrogen as it was felt that such a diet would be very monotonous, insipid and might not evoke the usual secretions in the gut, hence a low nitrogen diet was given which consisted of sago 100 g, starch 100 g, sugar 197 g, *kaddu* or calabash cucumber (*Lagnaria vulgaris*) 150 g, peeled potato 150 g, and ghee (butter fat) 69 g.

Sago 100 g, sugar 50 g and ghee 14 g were given as *halwa* while starch 100 g, sugar 50 g and ghee 47·8 g as biscuits. Morning meal consisted of *'halwa'*, biscuits and cooked potato; at lunch time biscuit and *kaddu* were given while night meal comprised of *halwa*, and cooked potato. All vegetables were cooked in ghee and salt added, no crushed condiments were used.

In the eairly morning and afternoon 147 g. of sugar with a lime juice was given as 'sherbat'. Besides these each subject was getting a supple-

* An enquiry under the Indian Council of Medical Research.

† Present address—Deputy Director of Health Services (Health), Patna Secretariat, Patna-1.

ment of 50 mg. ascorbic acid and two tablets of 'Beplex' each consisting of vitamin B_1 3 mg., riboflavin 1 mg., nicotinic acid 25 mg., and pyridoxine 0·5 mg.

(ii) Test diets—The foods of which the biological value was to be determined were analysed for their nitrogen content by the Kjeldahl method and total protein calculated by multiplying with the factor 6·25. Rice parboiled homepounded and whole wheat were purchased from the local market. Wheat was ground and whole wheat flour used in the test diets. The total protein content of rice, wheat flour and the two samples of pressed groundnut cake flour was 6·82 g, 11·59 g, 46·05 g., and 44·54 g. respectively per 100 g. of the samples.

Table 1 shows the composition of test diets and the forms in which they were given.

TABLE 1—SHOWING THE COMPOSITION OF TEST DIETS IN GRAMMES AT 5 PER CENT PROTEIN LEVEL PER HEAD PER DAY

Name of foods	Nature of recipe	Types of test diets				
		PGCF* diet	Pure rice diet	Rice & PGCF* diet	Pure wheat diet	Wheat & PGCF* diet
Sugar	Sherbat with a lime juice	—	—	—	64·0	72·0
Sago		100·0	50·0	75·0	100·0	100·0
Sugar	*Halwa*	56·8	28·4	42·6	56·8	56·8
Ghee		14·2	7·1	10·7	14·2	28·4
Potato	Cooked in oil and salt added	150·0	150·0	150·0	150·0	150·0
Kaddu		150·0	150·0	150·0	150·0	150·0
Mustard oil		14·2	14·2	14·2	14·2	14·2
Starch		100·0	—			
Sugar	Biscuit	56·8	—	—	—	—
Ghee		48·2	—			
PGCF*		67·80	—	16·95	—	17·5
Sugar	*Halwa*	42·6	—	28·4	—	—
Ghee		7·1	—	7·1	—	—
Rice	Cooked in water	—	459·5	343·0	—	
Wheat flour	Chapati	—	—	—	269·5	201·4
Ghee	With rice or chapati	—	29·0	20·0	42·5	32·4
CALORIES		2499	2504	2496	2497	2490

* PGCF = Pressed groundnut cake flour.

Rice was cooked in such a way that no rice water was left over. Weighed foods for each meal for all subjects were cooked at a time, the amount of water to each as also the cooking time was kept constant so that by careful cooking the final weight of the cooked food was always nearly the same. The moisture content of each was estimated. The subjects were served with weighed quantities of each cooked food, weight noted and fed in our presence. This enabled us to exactly assess the amount of food consumed by each subject.

The PGCF was mixed with the whole wheat flour and fed as *Chapatis*; aliquot portions of the cooked foods were taken and total protein estimated to be certain that the protein content was at 5 per cent level.

Daily variations that occurred in the amount of food consumed from subject to subject was restricted to nitrogen free food items only and the daily protein level for each subject was kept constant in this way. For every subject the total food consumed during the day was divided into four meals, the last being in the evenings, the total calorie intake in the first three means was calculated and for every 100 calorie increased or decreased intake in the first three meals adjustments were made by adding or removing from the last meal the quantities of food as given below, for each type of test diet:

Diet No.	Composition
1—Pure PGCF ...	2·7 g. PGCF, 2·3 g. sugar.
2—Pure Rice ...	18·3 g. rice, 9·1 g. sugar or 4·0 g. ghee.
3—Rice and PGCF ...	18·3 g. rice, 2·8 g. PGCF, 7·3 g. sugar.
4—Pure wheat ...	12·64 g. wheat flour, 13·85 g. sugar or 6·2 g. fat.
5—Wheat and PGCF	8·1 g. wheat flour, 7 g. PGCF, 17·2 g. sugar.

Each subject was getting vitamin supplements as stated earlier.

Subject J. P. was dropped off in the last two series of experiments for unavoidable reasons.

Clinical manifestations—When the subjects were on nitrogen free diet, they all complained of generalised muscular pain, pain at nape of the neck and lassitude and felt sleepiness throughout the day. No such complaints were noted on nitrogen diets.

RESULTS

Data arranged in Tables 2 and 3 show values for dietary nitrogen, urinary and faecal nitrogen outputs on the various types of diets and biological values and digestibility coefficients of the proteins of the corresponding diet. The latter two values were calculated as per formula reported by Mitra and Verma (*loc. cit.*).

TABLE 2—SHOWING THE DATA ON LOW NITROGEN DIET

Name of subject	Weight (lb.)	Total food intake, dry weight (g.)	Nitrogen in food (g.)	Output of nitrogen		
				Urine (g.)	Faeces (g.)	Total (g.)
J.P.	119	784·0	0·7767	1·0785	0·8038	1·8823
R.A.	96	746·7	0·7762	1·5334	0·6912	2·2246
R.U.	126	1072·6	0·8368	1·5167	1·1484	2·6651
S.M.	110	1070·0	0·8321	1·0489	0·7236	1·7725
M.R.	93	915·2	0·8052	1·6094	0·7665	2·3759

DISCUSSION

The assessment of the biological value and digestibility coefficient of wheat and wheat flour has been a subject of considerable study by various workers. The biological value and digestibility coefficient of whole wheat has been reported by Swaminathan (1937) as 66 and 93, Mitchell and Hamilton (1929) 67 and 91, Boas-Fixsen and Jackson (1932) 68. Kerbs and Mellanby (1942) have reported the digestibility coefficient of wheat nitrogen in 75, 85 and 100 per cent extraction to be 91, 89 and 82 per cent respectively. MaCance,

TABLE 3—SHOWING THE RESULTS OF NITROGEN BALANCE ON VARIOUS DIETS

Name of the subjects	Total protein faecal N (g.)	Low protein faecal N (g.)	Test protein waste faecal N (g.) (a-b)	Test protein (g.)	Absorbed N (g.) (d-c)	True digestibility $\frac{e}{d} \times 100$	Test protein urinary N (g.)	Low protein urinary N (g.)	Test protein waste urinary N (g.) (g-h)	Retained N (g.) (e-i)	Biological value $\frac{j}{e} \times 100$	
	a	b	c	d	e	f	g	h	i	j	k	l
TEST DIET NO. 1—PRESSED GROUNDNUT CAKE FLOUR (P.G.C.F.)												
J.P.	1·11	0·80	0·31	4·43	4·12	93·0	2·52	1·08	1·44	2·68	65·0	B.V. 68·7 ± 0·9
R.A.	1·28	0·69	0·59	5·06	4·47	88·3	2·94	1·53	1·41	3·06	68·9	D.C. 84·2 ± 2·6
R.U.	2·01	1·15	0·86	6·08	5·22	85·8	3·04	1·52	1·52	3·70	70·9	
S.M.	1·84	0·72	1·12	5·82	4·70	80·9	2·53	1·05	1·48	3·22	68·5	
M.R.	2·38	0·77	1·59	5·87	4·28	72·6	2·88	1·61	1·27	3·01	70·2	
TEST DIET NO. 2—ONLY RICE PARBOILED HOME-POUNDED												
J.P.	2·23	0·80	1·43	4·79	3·36	70·0	1·85	1·08	0·77	2·59	77·1	B.V. 73·4 ± 1·3
R.A.	2·49	0·69	1·80	5·24	3·44	70·1	2·60	1·53	1·07	2·37	68·9	D.C. 70·2 ± 1·8
R.U.	3·41	1·15	2·26	6·78	4·54	66·7	2·85	1·52	1·33	3·21	70·8	
S.M.	2·08	0·72	1·36	6·03	4·67	77·5	2·24	1·05	1·19	3·48	74·5	
M.R.	2·68	0·77	1·91	5·75	3·84	66·7	2·55	1·61	0·94	2·70	75·5	
TEST DIET NO. 3—RICE, PARBOILED HOME-POUNDED AND P.G.C.F.												
J.P.	1·35	0·80	0·55	4·91	4·36	88·8	2·15	1·08	1·07	3·29	75·5	B.V. 73·9 ± 0·6
R.A.	1·68	0·69	0·99	5·84	4·85	83·0	2·74	1·53	1·21	3·64	75·1	D.C. 77·8 ± 3·7
R.U.	3·02	1·15	1·87	8·14	6·27	77·0	3·26	1·52	1·74	4·53	72·2	
S.M.	2·69	0·72	1·87	8·24	6·27	76·1	2·77	1·05	1·72	4·55	72·6	
M.R.	2·83	0·77	2·06	5·76	3·70	64·2	2·57	1·61	0·96	2·74	74·1	
TEST DIET NO. 4—WHOLE WHEAT FLOUR												
R.A.	1·87	0·69	1·18	6·78	5·60	82·6	2·79	1·53	1·26	4·34	77·5	B.V. 77·0 ± 1·2
R.U.	3·06	1·15	1·91	9·82	7·91	80·5	3·62	1·52	2·10	5·81	73·4	D.C. 81·9 ± 1·3
S.M.	2·23	0·72	1·61	11·32	9·71	85·7	3·23	1·05	2·18	7·53	77·5	
M.R.	2·23	0·77	1·46	6·78	5·32	78·8	2·69	1·61	1·08	4·24	79·5	
TEST DIET NO. 5—WHOLE WHEAT FLOUR AND P.G.C.F.												
R.A.	1·15	0·69	0·46	6·59	6·13	93·0	2·75	1·53	1·22	4·91	78·5	B.V. 77·7 ± 1·1
R.U.	2·69	1·15	1·54	9·65	8·21	84·0	3·60	1·52	2·08	6·03	74·3	D.C. 85·1 ± 2·4
S.M.	2·43	0·72	1·71	11·20	9·49	84·7	2·96	1·05	1·91	7·58	79·5	
M.R.	2·35	0·77	1·58	7·40	5·82	78·6	2·87	1·61	1·26	4·56	78·4	

et al (1945) from a study of the literature feel that these were the most satisfactory values, and they have themselves by the assessment of calories in whole wheat by bomb calorimeter after making due allowance for fibre, as suggested by Moran and Pace (1942), and for the nitrogen in faeces reported the digestibility coefficient to be 86 per cent. All these experiments were with the rats as experimental animals except that of Kerbs and Mellanby (*loc. cit.*). MaCance and Widdowson (1947) have assessed the digestibility coefficient 80 and 90 per cent extraction flour with men as experimental subjects and reported "It has often been shown that raising the extraction leads to a net gain of crude protein for human nutrition, and secondly, the protein added when the extraction is raised comes from the germs and aleurone layer of the bran and both appear to contain a rich and valuable mixture of amino acids. Raising the extraction lowered the apparent digestibility." The digestibility coefficients reported are for Euglish and Manitoba flours, values for 80 per cent extraction flours being 83·4 and 90·4 while for 90 per cent 80·0 and 87·2 respectively.

The biological value of $77{\cdot}0 \pm 1{\cdot}2$ obtained in the present experiment was higher than the values reported so far by animal experiments while the digestibility coefficient of $81{\cdot}9 \pm 1{\cdot}3$ was similar to that of Kerbs and Mellanby (*loc cit*) for 100 per cent extraction flour. The high biological value and low digestibility coefficient of whole wheat flour as obtained by us was in consonance with the views of MaCance and Widdowson (*loc. cit.*). Thus the protein of whole wheat flour showed an advantage over other types of flour which fact was also reported by McCarrison (1930) by observing better growth of rats on whole wheat flour than on refined flour.

The biological value of parboiled homepounded rice in this investigation was $73{\cdot}4 \pm 1{\cdot}3$ per cent. This value was slightly lower than those reported by Swaminathan (*loc. cit.*), Basu and Basak (1937) and Acharya *et al* (1942), their values being 80, 80 and 80·27 respectively. In this connection it has to be borne in mind firstly that none of the samples of rice was parboiled homepounded and secondly that the work was done on rats. Hence it is a little difficult to compare the figures.

The digestibility coefficient and biological value of the pressed groundnut cake flour was $84{\cdot}2 \pm 2{\cdot}6$ and $68{\cdot}7 \pm 0{\cdot}9$ respectively. It had a supplementing effect on the biological value of both rice and wheat proteins, the rice and pressed groundnut cake flour, and wheat and pressed groundnut cake flour gave a value of $73{\cdot}9 \pm 0{\cdot}6$ and $77{\cdot}1 \pm 1{\cdot}1$ respectively, while the computed values according to Mitchell and Carman (1926) were 71 and 74 respectively. Thus in each case a definite supplementing effect is indicated.

Summary

Assessment of the biological values and digestibility coefficients of whole wheat flour, parboiled homepounded rice, pressed groundnut cake flour and a mixture of these was done on five adult human volunteers, the proteins fed being at 5 per cent level.

The biological values and digestibility coefficients of parboiled homepounded rice, whole wheat flour and pressed grountnut cake flour were $73{\cdot}4 \pm 1{\cdot}3$ and $70{\cdot}2 \pm 1{\cdot}8$; $77{\cdot}0 \pm 1{\cdot}2$ and $81{\cdot}9 \pm 1{\cdot}3$; $68{\cdot}7 \pm 0{\cdot}9$ and $84{\cdot}2 \pm 2{\cdot}6$ respectively.

The biological value and digestibility coefficients of pressed grountnut cake flour protein fed mixed with rice or wheat proteins (1:3) were $73{\cdot}9 \pm 0{\cdot}6$ & $77{\cdot}8 \pm 3{\cdot}7$ and $77{\cdot}1 \pm 1{\cdot}1$ & $85{\cdot}1 \pm 2{\cdot}4$ respectively.

The protein of pressed groundnut cake flour had definite supplementary effect on the rice or wheat proteins.

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INDIAN MEDICAL RENAISSANCE—WHEN AND HOW?

New dimensions of thought develop in a free society. They need not be rational or scientific, but more often evolve out of emotional, traditional and economic factors existing in that particular free society. Actions follow thoughts and muddled thinking leads into confused and even chaotic action. Is Indian medicine following this path today? The three factors to be considered in the growth and development of medicine in India are: Status of basic medical sciences, economic status, and social conditions.

Let us take up the question of the status of medical sciences first. Without describing the growth of scientific medicine, one can state that medicine in India has not yet "come of age". It is still heavily dependent on foreign relationships for its continued growth and reflects the successive influence of British and American medicine and science.

Why are we so dependent upon these influences? One obvious reason is that India lags considerably behind in the development of the basic medical sciences, the foundation of all scientific clinical medicine. And who should be responsible for this development of the basic sciences? Our educational system has placed that responsibility with the Universities. To raise the standard of medical basic sciences so that it will be accepted internationally must be a primary University goal. The Universities, as academic governing bodies, and the Government, can and must stimulate the development of medical sciences. This encouragement can be both academic and financial.

Turning our mind to the economic status we find that the vast majority of the people in India live in rural areas in poverty. It is obvious that modern scientific medicine is expensive. How can this modern scientific medicine reach this mass of the people who cannot afford even adequate food daily? In such circumstances, these illiterate, poor people will accept anything called "medicine" when it is priced at their economic level.

The situation is also frustrating to the present-day scientifically trained medical man. The medical graduate who has been trained in the surroundings of highly technical personnel, equipment and medicine, is asked to function in this same scientific manner in rural areas. He is expected to translate his training to a situation where there is little or no equipment, little or no technical help and few or none of the expensive medicines used in the training hospitals. No wonder he is at a loss and discouraged. It is not surprising that the usual graduate avoids or runs away from this situation and crowds in the cities where he seemingly has a chance to practice the medicine he has learned. Even devoted public minded young graduates find the practice of scientific medicine in rural areas difficult. Yet, this situation can be corrected if our young men are scientifically trained to do rural work.

Our medical colleges have to re-orientate their programmes so that they meet the needs of the public and train their students in such a way that reasonably priced scientific medicine can reach our country's people.

Expensive investigations, highly trained laboratory personnel and expensive medicines must not be made the *sine qua non* of practical universal modern medicine.

Finally let us take up the question of social conditions. Illiteracy, superstition and tradition have not only changed the thinking but also exert an emotional influence on the life of an individual. In western countries, about two centuries ago there was a renaissance in medicine. In our country, this renaissance is yet to come; we are nearly 200 years behind in medical science. Even our politicians, our leaders, have not been trained to think scientifically. Discussions centre about 'systems' of medicine instead of concentrating on the method of introducing scientifically sound medical basic science. Their thinking has been coupled with terminology such as 'indigenous medicine'; 'integrated medicine'; 'auyurvedic medicine' and other systems of medicine. Emotions have been kindled in "Swadeshi" thinking in respect to these systems. Our Vice-president has aptly stated that there is only one medicine and that is scientific medicine.

What is the outcome of this kind of thinking and resultant action? Instead of receiving scientific medicine, the people get the result of emotion, tradition and superstition. Perhaps a significantly better situation is dependent upon a better economic standard, a stabilisation of the industrial revolution that is now taking place in our country, and upon a higher degree of literacy. There is a faint ray of hope that a renaissance in medicine might sooner appear if our Universities think and act clearly in this matter.

CURRENT MEDICAL LITERATURE

Chronic Pancreatitis without Pain

BARTHOLOMEW AND FOMFORT (*Proc. Staff Meet. Mayo Clin.*, **32**: 361, 1957) from the Section of Medicine, Mayo Foundation, write that chronic pancreatitis typically is a painful disease. In fact, the outstanding feature is the severe painful abdominal seizure. Such attacks of pain may be the only manifestation of the disease for many years, but sooner or later, as destruction of the gland progresses, other features, such as diabetes, pancreatic calcification and steatorrhoea, appear and clearly point to the pancreas as the seat of the disease. The pain may not be of long duration. In fact, it may be of short duration, mild, and even absent, but in the absence of pain the diagnosis is rarely suspected until the late sequelae develop.

The outstanding clinical feature in each of the 10 cases was steatorrhea. This was invariably associated with loss of weight, which occurred in spite of a ravenous appetite. Pancreatic calcification was demonstrated by roentgenograms in eight cases and by palpation at surgical exploration in the remaining two cases. Diabetes mellitus was diagnosed in seven of the 10 cases. In four of the seven cases treatment with insulin was required to control the diabetes. Recurrent jaundice and the formation of a cyst of the pancreas were infrequent but significant complications. The 10 cases fell into three distinct groups divided according to the sequelae: steatorrhea, calcification of the pancreas, and diabetes mellitus. Group 1 consisted of three patients who had steatorrhea and pancreatic calcification but not diabetes mellitus; group 2 consisted of five patients who had all three sequelae; and group 3 consisted of two patients who had steatorrhea and diabetes mellitus but no pancreatic calcification.

Rheumatic Manifestations in Hodgkin's Disease, Leukaemia and Allied Conditions

PAQUET AND DELAGE (*Canad. M.A.J.*, **76**: 927, 1957) from the Department of Medicine, Hotel-Dieu and Saint-Sacrement Hospitals, Quebec, write that osteo-articular pain is a frequent accompaniment of Hodgkin's disease, acute leukaemia and multiple myeloma. Particular attention is paid to dorsal, lumbosacral and sacroiliac pain. Clinical, radiological and pathological considerations are presented. No constant relationship exists between painful manifestations and x-ray patterns. The spine is most commonly involved in Hodgkin's disease and particularly the lumbar segment, giving rise to low back pain with or without radiation to the legs. Symptoms referable to the bones and joints are more frequently seen in acute leukaemia of children than in the other types of leukaemia. Diagnostic difficulty may exist with rheumatic fever. Although infrequent in chronic leukaemia, rheumatic pain is more often observed in myelocytic than in lymphocytic types. General data on the number of cases studied and the incidence of rheumatic complaint in these cases are presented. It is concluded that pain is particularly prominent in multiple myeloma and Hodgkin's disease, and that lumbar or dorsolumbar segments of the spine are the most commonly affected. Pain occurs frequently at the onset of acute leukaemia and multiple myeloma.

Hypercortisonism in Patients with Rheumatoid Arthritis

SLOCUMB AND OTHERS (*Proc. Staff Meet. Mayo Clin.*, **32**: 227, 1957) from the Section of Medicine, Mayo Foundation, give below the summary of their observations on the diagnosis, treatment and prevention of hypercortisonism in patients with rheumatoid arthritis:

Excessive hormonal dosage with cortisone, hydrocortisone, prednisone, prednisolone or corticotropin produces not only general effects of hypercortisonism but also may produce certain special effects of hypercortisonism.

Special effects of hypercortisonism in patients with rheumatoid arthritis are characterized by the cyclic, and usually associated, occurrence of increased fatigability, significant emotional instability and generalized muscular and articular aching. Diffuse mesenchymal reactions simulating systemic lupus erythematosus or periarteritis nodosa also may develop. These diffuse mesenchymal reactions are serious and may be fatal complications of prolonged hormonal overdosage but do not reflect the degree of underlying rheumatoid activity which may or may not be minimal after the rheumatoid patient recovers from the effects of chronic hypercortisonism.

When chronic hypercortisonism has occurred in rheumatoid patients, dosage of hormones needs to be gradually and slowly reduced in conjunction with other treatment until the signs and symptoms of excess dosage have disappeared. When reductions of dosage have been too rapid, a flare of the rheumatiod arthritis or other mesenchymal reaction may develop. If this occurs severely, the dosage may need to be temporarily increased and thereafter reduced more slowly. In other instances less severe flares may subside spontaneously, if further reduction of dosage is temporarily deferred. In some patients, hormonal therapy ultimately may need to be discontinued for several months or longer in order to permit complete disappearance of the signs of hypercortisonism. When signs and symptoms of hypercortisonism have been eliminated, small doses of hormones within anticipated limits of tolerance for the patient's age and sex may be used satisfactorily if needed in addition to other treatment for control of the rheumatoid arthritis.

Patients receiving hormonal therapy may need short periods of increased doses of adrenocortical hormones in case of the added stress of surgical procedures, severe trauma or infections. Similar precautions are required for those patients who have received adrenal steroids in the previous 3 to 6 months or in the previous 6 to 12 months if hypercortisonism had been present.

The usefulness of these hormones for patients with rheumatoid arthritis is not judged by reactions developing as a result of overdosage. Optimally tolerated doses of cortisone or its effective analogues or corticotropin are potent and valuable therapeutic agents despite the effects of hypercortisonism in patients with rheumatoid arthritis. However, in the long-term treatment of

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rheumatoid arthritis, dosages of exogenous adrenocortical hormones or corticotropin that result in either general or special effects of hypercortisonism are not advantageous and should be avoided.

Splenomegaly : A Follow-up Study

CHAUDHURI AND SAHA (*Bull. Calcutta School Trop. Med.*, **5** : 163, 1957) from the Calcutta School of Tropical Medicine made a follow-up study (for a period 2-4 years) of sixty cases of splenomegaly—43 treated medically and 17 by splenectomy. The analysis of their findings is given below in a tabular form :

Groups	Treatment	Results
A. Non-operated cases (43 cases)	A course of quinine for 7 days followed by suppressive treatment by camoquine (0·2 g.) and primaquine (10 mg.) weekly or fortnightly for 6 months to 1 year	Good. No fever, spleen reduced remarkably, liver also reduced; general improvement
1. *Early stage* (22 cases) Duration no more than 4 years Spleen — 2½-3½ inches, firm Liver—1 inch Little or no anaemia; no leucopenia No history of jaundice Hepatic biopsy—normal Radiological evidence of portal obstruction or hypertension—negative		
2. *Late stage* (14 cases) : Duration 3-12 years Irregular fever Spleen—5-9½ in., firm, hard Liver—3 inches, firm Anaemia—severe; leucopenia—marked Hepatic biopsy in 10 cases—abnormal Radiologically—splenoportal vein	Suppressive antimalarial treatment for 1-3 years	In 7 cases marked reduction in the size of the spleen and liver with gradual improvement in general health In 4 cases there was no improvement with liver biopsies showing active liver lesions In 3 cases there was marked deterioration with ascites, haematemesis or melaena. One died of hepatic failure and two are still living
3. *Terminal stage* (7 cases) Duration—8-18 years Spleen—5-7", hard Liver—hard and palpable (4 cases); not palpable (3 cases) Anaemia; leucopenia Ascites—6 cases with gastro-intestinal haemorrhage in 5 and jaundice in one Biopsy done in 4 cases with portal type cirrhosis in 3	Suppressive antimalarial treatment for 1-3 years and supportive treatment	3 died 4 had recurrent attacks of haematemesis
B. Operated cases (17 cases)	Splenectomy	3 died as a result of operation 1 died of hepatic coma one year after following a bout of haematemesis. Only 8 out of the remaining 13 cases could be followed up Of these 1 died with liver failure and 7 complained of progressive weakness with loss of weight; liver biopsy study revealed in 6 cases necrosis of liver cells and the lesion was found to be more advanced than in the pre-operative biopsies.

The authors maintain that a careful assessment of a case, specially about the state of the liver is indicated before splenectomy is done.

Effect of 'Nadisan' on Alloxan Diabetes in Rats and Rabbits

MUKHERJEE AND OTHERS (*Indian I. M. Research*, **46** : 57, 1958) from the Central Drug Research Institute, Lucknow, in describing the effect of 'Nadisan' on the course of alloxan diabetes in rats and rabbits observe :

Previous feeding of 'Nadisan' to albino rats fails to prevent the diabetogenic action of alloxan.

Long continued feeding of 'Nadisan' cannot cause any regression in alloxan-induced diabetes of albino rats or rabbits. 'Nadisan' therapy is equally ineffective, whether instituted early or late after the induction of the disease.

Tolbutamide in Diabetes

MCKENDRY AND OTHERS (*Canad. M. A. J.*, **77** : 429, 1957) from Ottawa Civic Hospital in reporting on their experience with tolbutamide ('Orinase') treatment of 100 diabetics selected more or less at random from office, clinic and hospital practice observe :

60 per cent were satisfactorily controlled with regard to blood sugar levels, using rather strict criteria control.

The factors influencing response to tolbutamide are : (1) Sex, females responding better than males; (2) age of onset of diabetes, age group of 40-80 obtaining better chance of control than cases outside this age group; (3) body build, diabetes of overage or heavy build responding better than thin patients; (4) duration of diabetes, patients having diabetes of less than 2 to 5 years' duration having better chance of responding than diabetics of longer duration and (5) former insulin requirements, patients requiring less than 25 units of insulin daily having better chance of responding than patients requiring more insulin.

The undesirable effects from the use of the drug are grouped under 3 heads, viz., (1) side-effects, e.g., epigastric discomfort, nausea and vomiting and stomatitis, skin eruption and general malaise of a vague type; (2) overdose effects such as hypoglycaemia and (3) loss of control of the diabetic state. One death occurred due to hypoglycaemic coma in an elderly malnourished man. Partly as a result of this experience a cautious approach to the use of high doses of tolbutamide is advocated. It is thought advisable to start with smaller doses of the drug and increase if necessary, rather than to begin with larger dose and decrease.

Prednisolone in Treatment of Tuberculosis

The following is the summary of a preliminary report by the Research Committee of the Tuberculosis Society of Scotland :

Preliminary results of treatment in a controlled trial are reported in which 46 patients were treated with chemotherapy alone and 44 with identical chemotherapy plus prednisolone.

Clinical improvement was more rapid, especially in those acutely ill, in those treated by prednisolone, and there was a more rapid fall in the erythrocyte sedimentation rate in this group.

Radiological improvement was significantly hastened by prednisolone over a six-months period, most of the significant difference occurring in the first two months. Cavity closure and sputum conversion were slightly hastened by prednisolone, but not to a significant degree.

No patients receiving prednisolone showed any significant evidence of deterioration, though a temporary "rebound" phenomenon was observed radiologically in one-sixth of cases. No serious side-effects were recorded.

The significance of these results is discussed. (*Brit. M. J.*, **2** : 1131, 1957).

Postural Dependency Treatment in Cavernous Pulmonary Tuberculosis

HENSCHEL (*Canad. M. A. J.*, **77** : 469, 1957) from the Department of Medicine, University of Saskatchewan in reporting on the experience of applying postural dependency treatment to some 40 patients with cavernous pulmonary tuberculosis observes :

In this treatment the patient maintains bed rest in such a position that the cavitation is dependent in relation to the rest of the lung, a position achieved in most cases by elevation of the foot of the bed and rotation of the body. The underlying parts of the lung assume a state of deflation with ensuing concentric relaxation of the cavitated area. Reduction in the size of the cavity is rapid and closure may be achieved in two to four months.

Concomitant chemotherapy is routine, and by rapid cavity closure the hazards of drug resistance and cystic changes are reduced.

The method of treatment carries no risks and is applicable in all cases of cavitary pulmonary tuberculosis, except (1) where multiple cavities are not in analogous segments or (2) when stenosing endobronchitis is seen at bronchoscopy.

The most frequently encountered side effects of postural treatment are the disturbances of the gastro-intestinal tract, e.g., nausea and anorexia but in none of the patients was interruption of treatment necessary. Two patients developed frozen shoulder which could be corrected by physiotherapy.

Postural dependency therapy is particularly useful preparatory to surgical procedures but in cases where operation is not advisable it is also of benefit.

Controlling Toxicity of Streptomycin

PENMAN AND OTHERS (*Tubercle*, **38** : 322, 1957, Ref. *Practitioner*, **180** : 262, 1958) write that pantothenic acid, in doses of 50 mg. thrice daily, is of value in controlling the neurotoxic symptoms of streptomycin. Among 31 patients who developed symptoms of vestibular damage during streptomycin therapy, symptoms improved in all but one, following the administration of pantothenic acid, and in 26 they disappeared entirely. Four of the patients who improved were discharged from the sanatorium too soon after the initiation of treatment to be able to decide whether the pantothenic acid would have produced complete relief of symptoms. It is emphasised that pantothenic acid was given at the first sign of trouble and before much vestibular damage could have occurred, and therefore the findings have no direct relevance to the possible value of pantothenic acid in well-

established cases. In the authors' experience, neither age, sex, nor duration of streptomycin therapy had any bearing upon the efficiency of pantothenic acid in relieving the symptoms of early vestibular disturbance.

Corticosteroids in Pemphigus

COSTELLO AND DANNENBERG (*J.A.M.A.*, **165** : 1249, 1957) from the Department of Dermatology and Syphilology, New York University—Bellevue Medical Center, Postgraduate Division, report that fifty-two patients with pemphigus were studied on the dermatological wards of Bellevue Hospital between 1951 and 1955. This makes a total of 322 patients with pemphigus whose cases have been reported from Bellevue Hospital during the period between 1911 and 1955. Of the 50 white patients in the present study, 60 per cent were Jews. Seventy-eight per cent of the patients were in the sixth, seventh, eighth, and ninth decades. The occurrence of pemphigus in men and women was approximately equal. The initial site of pemphigus bullae was the mucous membranes of the mouth in nearly 55 per cent of the patients. The importance of this frequent site of occurrence is emphasised in an effort to assure early diagnosis and early effective treatment.

The corticosteroids have proved to be the treatment of choice. The former high mortality rate of pemphigus (more than 90 per cent) has been reduced to about 33 per cent. A small percentage of the patients with pemphigus have been free of symptoms and signs for one, two or more years without further corticosteroid treatment and with no residul effects of the disease. In others the disease has been controlled by daily maintenance doses of the corticosteroids. The corticosteroids have been of considerable value in the treatment of pemphigus vulgaris (the common type, 81 per cent), of less value in pemphigus erythematosus, and of little permanent benefit in pemphigus foliaceus. The mortality rate probably may be further reduced by early diagnosis and prompt, adequate therapy with the corticosteroids. The cause of pemphigus is unknown, as is the reason for high incidence of the disease among adult Jews.

Moniliasis

BANERJEE (*Indian J. Dermat.*, **3** : 29, 1957) from Calcutta Medical College, gives a brief review of different manifestations of moniliasis and describes in detail a case of deep dermal and subcutaneous moniliasis which is rare and has not been reported before in India. The author also gives a regime of treatment of moniliasis which has been found effective in his department :

The affected parts must be kept free from moisture and to get that, contact with water be avoided as much as possible. Diabetes if present must be controlled.

Local treatment with 2 per cent alcoholic solution of gentian violet morning and evening is very effective. 1 per cent solution of silver nitrate in spirit aetheris nitrosi is effective too. Application of ointments containing 1 to 2 per cent hydrag. ammon. and 2 to 3 per cent acid salicylic helps in quick clearence of the infection.

In deep mycosis potassium iodide mixtures have been found helpful.

Lately antibiotic mysteclin orally and mycostatin ointment locally have proved successful in a large number of cases. In mucous membrane lesions (vaginitis and aural thrush) pessary containing 100,000 units of mycostatin proved very effective.

Paronychia and onychia are very resistant to usual treatment. X-ray exposures after controlling the inflammatory stages give satisfactory results—doses are 100r, once weekly, preferably unfiltered, for 4 weeks.

Tinea Pedis

LAHIRI (*Indian J. Dermat.*, **3** : 50, 1957) from Calcutta Medical College, in giving a review of 11,515 cases of tinea pedis investigated at Calcutta Medical College during a period of five years observes :

The organisms responsible for the causation of tinea pedis are mainly fungus.

Trichophyton rubrum is responsible for 65 per cent cases of tinea pedis. The incidence of trichophyton rubrum infection is on the increase in the tropics.

Prophylaxis plays an important role in the control and treatment of tinea pedis.

There seems to be some relationship between the complication of the fungal infection in the tropics with nutritional factors particularly with vitamin A and vitamin C.

Acute Lower-Respiratory Infections in Childhood

MORRISON AND OTHERS (*Lancet*, **2** : 1077, 1957) of St. Mary's Hospital, London, from an analysis of 191 cases of acute respiratory illness in children admitted into the hospital and investigated over three winters (1953-56) observe :

The cases were divided into four clinical groups according to the predominant clinical characteristics : (1) segmental pneumonia, 46 cases; (2) bronchopneumonia, 55 cases; (3) bronchiolitis, 51 cases; and (4) simple bronchitis, tracheobronchitis, and laryngotracheitis, 39 cases.

A highly significant correlation between the age of the child and the predominant clinical picture was found : the commonest illness in infants aged less than 1 year was bronchiolitis, in those aged 1-5 years bronchopneumonia, and in those aged more than 5 years segmental pneumonia. Laryngitis, tracheitis, and bronchitis were distributed equally among the age-groups.

Bacteriological examination was essentially centred on a supralaryngeal swab taken, so far as possible, after coughing and before the institution of chemotherapy. The common pathogens isolated were *Staph. aureus*, haemolytic streptococcus, pneumococcus, *H. influenzae* and coliform bacilli. There was no particular correlation of any of these with type of clinical picture, but the staphylococci and the coliform bacilli were commoner in infants aged less than 1 year, and *H. influenzae* was commoner in the older children.

Serum was collected from 92 children and tested for influenza virus A, B, and C for the adenoviruses. 27 per cent showed a significant rise in titre or a high convalescent titre. There was no relationship between any one of these viruses and a particular clinical picture or age-group, but the proportion of positive results as a whole was considerably higher in the older children. A preliminary group tested against Sendai virus produced 7 positives in 42 tests, indicating that this virus is worthy of attention.

Blood was examined in 90 per cent of cases. The white-cell counts were surprisingly unhelpful and proved to be a very inadequate guide to the type of infection and to the likelihood of response to chemotherapy.

Antimicrobial drugs were given in almost every case, and the overall clinical impression was that, whatever the clinical picture or the age of the child. Chemotherapy is indicated, even with a predominantly "virus" picture, because of the danger of secondary bacterial pneumonia. Chemotherapy may, however, be of secondary importance to oxygen therapy in infants with severe hypoxia associated with obstructive bronchiolitis.

Bronchonasal Allergy in Children

MANCHANDA AND OTHERS (*Indian J. Child Health*, **7**: 9, 1958) from the Department of Paediatrics and Medicine, Medical College, Amritsar, in giving the aetiological and clinical review of 175 unselected cases of bronchonasal allergy in children observe:

Of these 175 cases 118 (67·4 per cent) were males and 57 (32·6 per cent) females, showing preponderance of the males over the females. The greatest incidence of the onset of symptoms was during the first five years of life (56·6 per cent). Food allergy was present in only 28·5 per cent cases. The attacks were generally worse during change of weather especially during winter and rainy season. Diseases such as pneumonia (16 per cent), pertussis (10·3 per cent), measles (9·1 per cent), smallpox (1·2 per cent) and diphtheria (0·6 per cent) seemed to precipitate the condition. Surgery of the tonsils and adenoids done in 9 cases (5·4 per cent) either precipitated or aggravated the condition. Positive family history of allergy was present in only 29·7 per cent of the cases.

Pure nasal allergy was present in 3 per cent, bronchial allergy in 47·4 per cent, and combined bronchonasal in 54·6 per cent cases. 25·8 per cent cases started as nasal allergy, and the remaining 74·2 per cent with bronchial allergy.

Of the various complications, chronic bronchitis was present in 31·8 per cent, emphysema in 27·6 per cent, bronchiectasis in 3 per cent and chronic cor pulmonale in only one case.

Absolute eosinophilic count over 400/c.mm. was present in only 45·7 per cent cases.

Skin tests done on 19 selected cases, showed a positive reaction to one or the other allergens in only 11 cases.

Radiological abnormality was present in 13·2 per cent cases.

Serological Response of Children to a Third Dose of Poliomyelitis Vaccine

The following is the summary of a report to the Medical Research Council on the serological response of children to a third dose of poliomyelitis vaccine:

A study was made in a group of 100 children who initially had no detectable poliomyelitis antibodies, to determine the decline in antibody level after immunization with two doses of poliomyelitis vaccine, and the response to a third dose of vaccine given eight to eleven months after the second dose.

The decline in antibody level was greatest with types 1 and 3, resulting in a high proportion of children with low titres at the time of the third injection.

In the majority of children a substantial antibody response to all three types was obtained to the third injection of vaccine. (*Brit. M. J.*, **2**: 1207, 1957).

Radioactive Phosphorus in Polycythaemia Vera

FOUNTAIN (*Brit. M. J.*, **2**: 1335, 1957) from the Department of Medicine, General Infirmary, Leeds, gives below the summary of his observations on the treatment of 47 cases of polycythaemia vera with radioactive phosphorus (^{32}P):

A description is given of the clinical and haematological findings in this group of patients, and the results of treatment are assessed.

^{32}P was given intravenously in doses of 3 mC. In approximately 90 per cent of patients an initial remission was induced by a total dose of 9 mC. or less.

Of 40 patients who have been observed for more than three months after their initial treatment, all but two developed remissions of up to 37 months' duration. Subsequent remissions usually followed further courses of treatment.

CURRENT TOPIC

XII INDIAN CONGRESS OF RADIOLOGY

The following is a summary of the Presidential Address by Capt. P. B. Mukerji, B.SC., M.B. (CAL.), F.R.C.S. (EDIN.), F.F.R. (LOND.), D.M.R.E. (CAMB.), F.I.C.S., F.S.M.F. *at XII Indian Congress of Radiology, held at Kanpur, 1958.*

Members of the profession and radiologists, in particular, must be well aware of the ever-increasing expansion that is taking place in the field of radiological diagnosis and radiation therapy. To mention, briefly, some of these fundamental technical advances which are destined to modify current practices profoundly, I might refer to angiography which, by all accounts, appears to be the most actively expanding field of radiological interest at the present moment. Image amplification or photo-fluorography, which was only an idle dream of a few years ago, has made notable advances and promises to usher in revolutionary improvements in many orthodox methods of application of x-rays to diagnosis. Xeroradiography and other closely related technics such as, radiography with thullium 170 and xenon 133, promise

to lead to great revision of the standard photographic methods long employed in recording x-ray images. Another line of investigation that is being carried on is on electroluminescence and light amplifying phosphors which may, by increasing our knowledge concerning the conversion of electrical potential to visible light in crystalline solids, have practicable application in diagnostic radiology.

Another useful line of work concerns possible utilisation of many electronic devices for more expedient clinical application of x-rays in the fields of diagnosis.

In the field of radiation-therapy, a great deal of fundamental and corroborative work has been done on three important subjects which has outstripped all others; these are clinical and experimental uses of radioactive isotopes, radiobiological animal experiments on the effect of total body irradiation and methods of protection against radiation, and physics, dosimetry and treatment technics.

The advantages of rotational therapy at almost any voltage have been fully established and a number of rotational methods, both in vertical and horizontal planes, have been made available, all of which are claimed to yield good doses with satisfactory homogeneity in the tumour-bearing volume. The manufacture and availability of hectocurie telecobalt unit utilising rotational devices with a large opposing counterweight-baffle, which greatly reduces the scattered radiation, has solved the problem of high cost to a very great extent. The hectocurie telecobalt units not only permit a smaller cobalt source to deliver an effective dosage in a reasonable treatment-time but significantly reduce the amount of protection required in the walls.

One feels depressed in the thought that no contribution to this long list of advanced studies has been made by any institution or worker of India.

The pre-eminent and honoured position of radiology carries with it a very great responsibility for those who practise this speciality and on whom rests the obligation of maintaining this high and honoured position. The radiological chief should be a person of the calibre of a consultant to other specialists, viz., the surgeons, the physicians, the gynaecologists, the E.N.T. specialists etc. How many of the radiologists in India today come up to this high standard of technical training and academic eminence, covering a wide territory of clinical medicine and surgery? The number, as far as I could gather, is not very heartening or encouraging. In order to be a competent radiologist of the type we find as Heads of Departments in U.K., U.S.A. and the Continent and in order to claim equality of status with specialists in other branches of medicine, one must undergo, after qualifying, a period of clinical training in medicine and surgery for at least two years, during which period he should obtain his M.D. or M.S., and then enter upon his specialist training and spend, at least, another three years in a first class radiological department during which period he should complete his diploma course, followed by a year of intensive residency training under direct supervision of his departmental chief.

Let us now examine the reasons which lie beyond our control and which stand in the way of Indian radiology coming up to the standard of radiology as seen in the advanced countries of the West. The chief among these reasons are poor financial allotments to the departments of radiology attached to the teaching institutions and general hospitals, reluctance on the part of the authorities concerned to equip these departments with adequate number of up-to-date high power machines, great paucity of trained and qualified staff, large number of patients to be attended to in these departments during working hours every day, and absence of pressure on authorities from other departments for opening up of special units in the radiological departments for undertaking the newer and higher types of radiological investigations, as a matter of routine. I know the financial resources of our country are limited and there is necessity for tempering enthusiasm with a sense of reality; but I feel I can safely assert that national health is the foundation on which any plan of reconstruction must be based.

The third adverse factor that has begun operating in the direction lately, is a more formidable one and would require our very careful consideration for its solution. We are finding it increasingly difficult to induce any of the bright and brilliant graduates of our medical colleges to take to radiology as a career. This is, pre-eminently, due to the prohibitive cost of modern up-to-date x-ray apparatus, both diagnostic and therapeutic, which are necessary to quip a first rate clinic. Secondly, because other specialities offer better material prospects with much less investment. The Government should come forward and offer handsome stipends, scholarships and fellowships to the right type of medical graduates.

Training in radiology in the undergraduate course given at present in the medical colleges, is of a perfunctory character and does not meet the needs of the situation. When instruction on the subject is concentrated in one year, the student is unable to understand the subject as a branch of fundamental medical science. If, however, radiological instruction is begun with anatomy and physiology in the pre-clinical years and continued in relatively brief courses, each year, throughout the clinical period of study, the student will gradually build up a complete and sound conception of this branch of medical science. The teaching of radiology should be largely clinical and carried out with bed-side instruction during ward rounds as well as in the out-patients' department, in clinicopathological conferences and in routine medical and surgical lectures and demonstrations. The undergraduate course of training in radiology should include demonstration of the normal anatomical relations of the skeleton and of the organs of the chest and abdomen and fluoroscopic and skiagraphic demonstration of functions of the different systems of the body during the pre-clinical years ; and radiological pathology and interpretation of x-ray films in medical and surgical diagnoses and in special branches of medicine together with general radiology in clinical years. The course in general radiology should comprise brief courses of physics of the x-rays and radium, biological effects of x-ray and radium and radiotherapy.

Post-graduate teaching in all subjects is now con-

ducted, practically, throughout the country as a university function. Universities should be left with sufficient powers to add to the contents of the syllabus in any particular branch of study according to the facilities locally available to impart higher instruction in that particular branch.

Now let us turn to the control and regulation of the profession of radiology in India: In response to a reference made by the Government of India in 1948, the Association formulated its recommendations and forwarded them in July, 1951. A Bill was drafted on the lines suggested by the Association and was forwarded to the Indian Radiological Association for its comments.

The Bill proposed to establish a Central Council to make regulations to be called the Radiology Regulations, prescribing the minimum standard of education and training required for qualification as a radiologist, one effect of such recognition being that no person who did not hold a recognised radiology qualification would be entitled to be enrolled in any Register to be maintained by the States nor to practise the profession of radiology or to hold an appointment in any dispensary, hospital or other institution. The Bill also proposed to establish State Radiology Councils and Joint State Councils whose chief function was to prepare and maintain Registers of Radiologists for the states and to issue certificates of registration to the persons whose names were entered on the Registers. It was also provided that a person not possessing the qualifications required for entry on the first Registers could have his name entered on the first register for a period of three years, if he was practising radiology as his principal means of livelihood for 2 years; but, for retention of his name on the Register permanently, he must pass such an examination within a period of three years from the publication of the Register. Qualificaction for subsequent registration was the holding of a recognised qualification in Radiology.

The Central Government was empowered by notified order to provide for regulating or prohibiting the production, manufacture, sale, distribution and use of any irradiating apparatus or radioactive substance and such an order may provide for (1) regulating by licenses, permits or otherwise, the production or manufacture of any radioactive substance or irradiating apparatus and the storage, transport, distribution, disposal, acquisition, use or consumption thereof and (2) the entering and search of premises, vehicles, vessels, aircrafts and the seizure by a person authorised to make such search of any articles in respect of which such person has reason to believe that a contravention of the order has been, or is being, or is about to be committed, etc.

The proposal for the establishment of a Central Council was not acceptable because radiology was not a separate profession but a part of the profession of medicine for the regulation and control of which there is the Medical Council of India and the various State Medical Councils.

The proposal for having Radiology Regulations to prescribe the minimum standard of education and training required for qualification as a radiologist on the analogy of education regulations under the Pharmacy Act of India, was wholly unnecessary, as the courses of study, including the period of practical training and the examinations to be passed for obtaining a radiological qualification are governed by the regulations of the universities which grant such qualifications and there is no reason to believe that these regulations fall short of the standards which the proposed radiological council was to prescribe. The maintenance of a uniform minimum standard in this respect by the universities granting post-graduate diploma in radiology, has now devolved upon the Medical Council of India, the Post-Graduate Committee of which has been entrusted, under the Indian Medical Council Act, 1956, with the task of maintaining proper standards of all post-graduate degrees and diploma in medical science granted by Indian universities. Where is then the necessity of establishing another Council to do the same job?

The proposal of creating separate registers for entry therein of names of physicians who were in exclusive practice of radiology, was considered unnecessary since the names of these physicians were already borne on the State Medical Registers with entry of their radiological qualifications as additional qualifications against their names, if they so desired, and because there were no separate Registers for physicians practising other specialities of medicine.

The proposal of regulating the acquisition and use of irradiating apparatus and radioactive substances by physicians and radiologists by the issue of licenses, permits or otherwise, and the conferring of powers upon officers of the State to enter and search premises and to seize any articles in respect of which such officers had reason to believe that a contravention of a notified order had been or was being or was about to be committed, was most objectionable from the point of view of the honour and dignity of the medical profession. This proposal was tantamount to reducing the position of the profession to that of a tradesman.

Reverting to the question of the overall radiological needs of the country and the number of qualified and trained radiologists available to meet those needs, on the basis of which alone the very important question of control and regulation of the profession and practice of radiology in the country can and should be tackled, I may inform that today the total number of radiologists available in the country does not exceed 400 to 500. Now, what ratio does this number bear to the total population of the country which is a little over 36 crores (approximately)? This ratio works out at one radiologist to 1 million or 10 lakhs of people. Is this the time to think of control and regulation of the profession and practice of radiology in India? Is it not time for us to sit up and concentrate all our energies in finding out the best and quickest way of producing as many properly-trained and qualified radiologists in the shortest time possible to meet the radiological needs of the country, and, until that desired goal is attained, to get as many other physicians in the country interested in x-ray work and give them some training so that the teeming millions of our countrymen throughout the length and breadth of the country may get some radiological service in place of no such service at all? I present some figures and tables based upon a survey carried out

by the Professional Bureau of the American College of Radiology between 1946 and 1950 on the distribution of radiological services in the U.S.A. (Donaldson, *Am. J. Roentgenol. Radium Therap.*, December, 1951). The following are some of the figures to which I would draw serious attention.

Population of U.S.A. in 1950 ...	150,697,361 (over 15 crores)
Total number of practising physicians	151,267
Physicians : Population ...	1 : 1,000
Certified Radiologists (full specialist)	3,000
Non-certified Radiologists (Special interest)	500
Second and Third Year Residents	600
Total of Radiologists, Assistants and Residents	4,100 (full-time)
General Practitioners and other Specialists owning their own X-Ray equipment	31,000 (part-time)

These figures give one full-time radiologist to 36,755 population (in 1931, this was 1 to 122,000); and, if whole-time and part-time radiologists are counted, it works out at one x-ray worker to 4,293 population.

The proportion of radiologists to practising physicians would work out as follows :

Full-time certified Radiologists : Physicians	1 : 50
Total Physicians rendering X-Ray Service : Physicians	1 : 4·3

Of 250,000 patients seen each day by the physicians in U.S.A. about 83,000 i.e. 1 of each 30 patients seen is referred to a radiologist for investigation and opinion.

From the above figures, we can draw the following conclusions with regard to the requirements of our country :

No. of physicians required for 36 crores of people, according to U.S.A. standard i.e. 1 per 1,000 population	360,000
The Bhore Committee, however, considered this standard too high, and therefore, recommended 1 physician for 2,000 people; according to this, our requirement would be	180,000

In U.S.A., there were 4·3 physicians rendering radiological service to the patients of 1 physician; according to this ratio, we should have 41,860 physicians rendering x-ray service to the patients of 180,000 doctors. This number is nearly half of 83,857 x-ray workers who will be needed, if we calculate our requirements at 1 x-ray worker per 4,293 population, as in U.S.A. Since this ratio is too high for our country, we should be satisfied with 1 x-ray worker per 10,000 population i.e. 36,000 for the 36 crores of our people.

I would next draw your particular attention to Tables 1 and 2 (Donaldson's).

TABLE 1—PHYSICIANS OWNING THEIR OWN X-RAY UNITS IN U.S.A. IN 1951

Type of practice	Total physicians	Physicians owning x-ray	Percentage of total physicians owning x-ray units
General practitioners ...	73,079	19,680	61
General surgery ...	19,976	3,000	9·3
Internal medicine ...	12,079	2,200	6·8
Radiology	3,559	1,300	4
E.N.T.	10,788	1,090	3·4
Dermatology ...	2,110	1,050	3·3
Industrial medicine ...	2,122	840	2·6
Orthopaedic surgery ...	2,532	810	2·5
Paediatrics ...	6,321	750	2·3
Urology	2,809	700	2·2
Cardiology	916	290	0·9
Gastro-enterology and tuberculosis ...	2,277	200	0·6
Obstetrics & gynaecology	6,798	180	0·6
Allergy	703	160	0·6
	146,129	32,250	100

These figures are highly instructive; they show that even as recently as 1951, of the total number of physicians owning x-ray equipment, the radiologists formed only 4 per cent and the remaining 96 per cent of the x-ray apparatuses were owned by non-radiologists.

TABLE 2

City size	General practitioners	Specialists (including radiologists)	Total
Under 5,000 population ...	6,490	Nil	6,490
5,000 to 25,000 ,, ...	4,530	1,890	6,420
25,000 to 50,000 ,, ...	980	2,150	3,130
50,000 to 100,000 ,, ...	1,770	1,740	3,510
Over 100,000 ,, ...	5,910	6,790	12,700
	19,680	12,570	32,250

Table 2 shows that in cities below 25 thousand population, radiological service is rendered mostly by general practitioners.

Let us now compare the conditions existing in India today with those that obtained in the U.S.A. in 1950-51. We have in our ccountry one x-ray worker to ten lakhs of people, as against one full-time radiologist to 36,755 population, and, if all x-ray workers were counted, one x-ray worker to 4,293 population of U.S.A. I have already shown previously that, basing our requirements on one

x-ray worker for 10,000 population, instead of 1 for 4,293 as in U.S.A., we need 30,000 x-ray workers today and we have barely 500 to 600 such persons. The output from the three Indian Universities, which run post-graduate diploma courses in radiology, does not, I believe, exceed 50 to 60 per year; and the number, who secure this training in foreign countries and return to India with a post-graduate qualification in radiology, will hardly exceed one or two dozens a year. The number of x-ray workers in the country may be speedily increased. This can be done, in my opinion, if we recommend to the authorities concerned the adoption of the following measures:

1. To request those universities, possessing medical faculties and where adequate facilities are available in the medical colleges affiliated to them, to open post-graduate diploma courses in radiology.
2. To request State Governments to offer inducements to medical graduates to take to radiology as a specialist career.
3. To increase the number of admissions to the D.M.R.E. courses in those universities which run such courses.
4. To get general practitioners and other specialists interested in x-ray work and arrange a shorter course of training for them, say, of six months, so that they may render part-time radiological service in outlying hospitals and to their own patients.
5. To arrange refresher courses for the part-time and full-time radiologists at suitable times of the year.
6. To start mobile x-ray units with their own generators and processing rooms which will move from place to place, from one union health centre to another, and, if necessary, from village to village, to render travelling and domiciliary radiological service, on the same lines as mass chest x-ray survey units.

There are a few other subjects of very great importance to the profession of Radiology to which I would like to draw the serious attention of the authorities who are in charge of the Health portfolio in the Centre and the States. The first of these subjects relates to the opening up of training centres in the various parts of the country for radiographers and technicians in radiotherapy. Except for one such centre in Bombay and another in Madras, I do not know if satisfactory arrangements are available in other places for imparting systematic instruction to persons who are willing to take up these lines as their life's career. It is, therefore, necessary that every State in India should have a radiographer's and technician's training centre started in the radiological department of the premier hospital of the State and all such centres should have a training programme based on a uniform syllabus and curriculum of studies on the same lines as those of the Society of Radiographers of U.K., with modifications necessary to suit the special needs of our country. X-ray and electro-medical apparatus manufacturing industry stand exactly where we did ten, twenty or thirty years ago. I would appeal to the Union Government to formulate programmes of similar nature with regard to the manufacture in India of x-ray and electro-medical appliances without the aid of which the practice of modern medicine is impossible and, with the availability of which in the country, a large saving will be effected in our foreign exchange resources.

NOTES AND NEWS

Central Repository for Medical Credentials

The Secretary General of The World Medical Association announced that on July 1, 1958, the services of a Central Repository for Medical Credentials will become available to the doctors of the world. All judicious precautions will be exercised to protect the records of depositors.

The development of the Central Repository for Medical Credentials has been in process for approximately four years.

The life-time cost of the service on a one-payment basis to the newly graduated doctor is approximately $60.00 (U.S.A.). An actuarial schedule has been established for doctors in the various age groups. A ten year service rate is also available.

Provisions have been effected for the depositor to add additional credentials he receives to his file in the Repository at a minimal service charge.

The Central Repository for Medical Credentials is a necessary precaution to assure the doctor that he can always prove himself medically qualified to practise his profession should the diplomats and the governments they represent fail in their efforts to achieve world peace.

Additional information on the Central Repository for Medical Credentials is available from The World Medical Association, 10 Columbus Circle, New York 19, New York.

The Nutrition Society, London

The following is the programme of a symposium to be held in London on Friday July 11th, 1958, on Applied Nutrition: the Human Factor in Group Feeding, under the Chairmanship of Professor J. Yudkin of Queen Elizabeth College, University of London. The following subjects will be discussed:

Historical introduction on the work of Alexis Soyer; The human factor in hospital feeding; The human factor in school feeding; The human factor in the feeding of large groups of men; The problems of feeding women in industry.

Eradication of Malaria in Six Years

Work has begun throughout India for the eradication of malaria in six years.

The plan seeks to eliminate the malaria parasite by the radical cure of every malaria patient.

At the end of the six-year period it is hoped that every individual in the country will be free from the infection. The malaria carrying mosquito will then be rendered harmless as it will have no malaria parasite to transmit from person to person.

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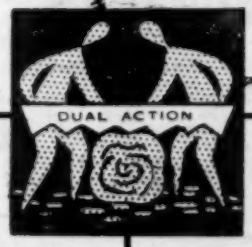

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The mosquito was the target of attack in malaria control measures taken so far. The strategy of the new campaign is to destroy the malaria parasite living or lying dormant in the blood streams of persons attacked by malaria.

Sharing in the bid to rid India of the scourge are the Government of India, the State Governments and the Technical Co-operation Mission of the United States Government.

Malaria eradication programmes are being undertaken on a global basis. Among the countries in the East, India has taken the lead in the present campaign.

Experts regard the present time opportune for a change of tactics in the fight against malaria. The spraying of DDT to destroy malaria-carrying mosquitoes has undoubtedly yielded spectacular results and reduced the incidence of malaria. But, in some countries, the constant use of DDT has helped mosquitoes to develop a resistance against the insecticide.

The six-year malaria eradication programme includes an intensification of DDT spraying to reduce the incidence of malaria to the minimum and the launching of a house-to-house surveillance for detecting and curing every malaria patient so that he ceases to be a source of infection.

The country-wide surveillance will begin at the end of the second year of the six-year programme and will be maintained for the following four years. To detect cases of fever 100 investigators are proposed to be appointed for a population of one million. Each investigator will be entrusted with a group of 2,000 houses. It will be his duty to visit them every fortnight and make inquiries. When a case of fever is detected, the investigator will collect a blood smear of the patient and send the slide to the laboratory. If malaria parasite is found in the blood, the patient will be sent to a doctor for intensive treatment, to be continued until the patient is free from the malaria parasite and no more a source of infection.

The insecticides equipment and the vehicles necessary to implement the scheme will be supplied by the U. S. Government under the Indo-U.S. Technical Assistance Agreement. The Government of India will share half the increased costs on the additional work with the various State Governments and also increase the staff at the Malaria Institute of India, both for supervision in the field and for training new personnel.

Malaria Survey

The four-member survey party, headed by Dr. C. P. Nair, Director, Malaria Institute of India, which visited the Laccadives, Minicoy and Aminidivi group of islands has returned.

The team went there to survey the incidence of filaria and malaria in the group of islands. The party visited nine islands,—Aminidivi, Kodamat, Agathi, Kavarathi, Androth, Kalpeni and Minicoy and two others—and completed the survey. According to the survey Androth appears to be the worst affected group of islands.

A report on the survey is expected to be presented to the Government of India which will then organise measures to control the spread of the diseases.

Human Heredity Problems

The Human Variation Unit, which was established at the Cancer Research Institute in Bombay in 1953, with a grant from the Rockefeller Foundation and Sir Dorabji Tata Trust, will be taken over by the Central Government in April, 1959.

According to an official Press release, the Unit has taken a leading role in carrying on studies on the distribution of blood groups and other genetical characteristics in some endogamous groups, castes and sub-castes in Bombay. There are enormous diversities among the people of India. The Unit makes use of this unique human material for study of the problems of human heredity.

It has also assisted in the establishment of a Blood Group Reference Centre for India by the Indian Council of Medical Research by suppying laboratory facilities and trained personnel and some re-agents not available in the country. The Centre has been functioning in Bombay since the beginning of 1957.

The Unit is one of the constituent activities of the Demographic Training and Research Centre established recently in Bombay. It is participating in some of the programmes of teaching as well as research in connection with the qualitative aspects of population.

Union Health Minister's Welfare and Discretionary Fund

Answering questions in the Rajya Sabha on April 28, 1958 on the Health Minister's Welfare Fund and Discretionary Grant in 1957, Shri D. P. Karmarkar, Minister of Health, said that the T. B. Association of India was given a grant of Rs. 1,43,000 from the Welfare Fund in 1957. Among other grantees from the Fund are the Medical Superintendent, Safdarjang Hospital, Rs. 1,000 for amenities to patients; the Ministry of Health Sports Club, Rs. 500, and Shri Tikam Singh of Bulandshar district, Rs. 25 for distress.

The Minister also laid on the table a statement giving the names of 108 institutions which were given help totalling Rs. 5 lakhs from the Health Minister's Discretionary Grant during the year 1957-58.

Co-ordination of Anti-Leprosy Work

Inaugurating the conference convened by the Gandhi Memorial Leprosy Foundation at Sevagram on April 27, 1958, to consider the problems of co-ordination of anti-leprosy work in the country, Shri D. P. Karmarkar, Minister for Health, welcomed the proposal on behalf of the Government of India.

He said, "that the expansion of the activities of the leprosy programme by Government and voluntary organisations should be on a complementary basis so that overlapping and duplication of services in the same area may be avoided."

Shri Karmarkar also added that the emphasis in leprosy treatment seems to be shifting from institutional treatment of advanced cases to early detection and

systematic treatment. This approach, he said, has had the approval of the Government of India. As a result of it, the Government have, under the National Leprosy Control Programme, provided for subsidiary centres, the main functions of which are to carry out intensive surveys in specified areas of a population of 50,000 to 60,000, and thereafter to follow up regular treatment of cases detected as a result of the survey. These subsidiary centres not only contemplate treatment in the centre but also domiciliary treatment. The Government have provided for the establishment of 100 such subsidiary centres during the second Plan period, and for the current year a sum of Rs. 35 lakhs has been earmarked for the establishment of 35 centres. The State Governments have so far established 60 centres throughout India with assistance from the Central Government.

Gift of Vaccines for Pakistan

To meet the outbreak of epidemics in East Pakistan, the Government of India have made a gift of one lakh doses of cholera vaccine and one lakh doses of smallpox vaccine to the Government of Pakistan. These have been despatched to East Pakistan by air.

Caffeine Plant in Kerala

A Bombay firm will soon set up in Kerala a plant for the production of caffeine from tea waste.

The project is sponsored by Unifine Pharmaceuticals, an associate of Unichem Laboratories and the Rs. 10-lakh plant is expected to go into production by July this year.

The factory will be set up in Devicolam high ranges and will initially start with processing 1,000 maunds of tea waste a month producing over 1,200 pounds of caffeine. The capacity will be trebled in six months. The new company has expansion plans which include the preparation of liver extract, crude drug extract from nux vomica etc.

West Bengal Medical Council

Dr. K. K. Bagchi, B.SC., M.B. (Registration No. 4885) of 24, Basanta Bose Road, Calcutta, Dr. Pannalal Chatterjee, M.B. (Registration No. 9529) of 40/1A, Hemchandra Street, Calcutta 23, and Dr. Jagadisnarayan Ray, L.M.F. (Registration No. 16520) of Dr. Rajendra Prasad Hospital, Darihat-On-Sone, P.O. Akoshi, Sahabad, have been found guilty of infamous conduct in professional respect, and the names of these three doctors have been removed from the Register of Registred Medical Practitioners maintained by the Council under section 15 of the Bengal Medical Act, 1914.

State Medical Faculty of West Bengal

In the Revised Regulations for the Membership Examination of the State Medical Faculty of West Bengal provisions have been made for persons who had passed the Final M.M.F. examination prior to 1st September, 1953, to appear at the Final M.M.F. examinations under the Revised Regulations as a non-collegiate student before the expiry of 1960. The following note has been incorporated in the Revised Regulations :

"A person who passed the Final M.M.F. Examination of the Faculty prior to 1st September, 1953, may, before the expiry of the year 1960, appear at the same Examination under the present regulations as a non-collegiate student and without further training. Such a candidate shall also be not required to undergo the Instructions contained in Section D of these Regulations after passing the Final Membership Examination."

CORRESPONDENCE

The Editor is not responsible for the views expressed by correspondents

Membership Drive

SIR,—Personal contacts with the members of the profession bring about the best results whether in collection of funds or enrolment of members. It has been suggested that our Presidents and Vice-Presidents should tour round the country for at least a month during their tenure of office. Being very busy in their own fields of work, it will be difficult for many to undertake this job. An alternative plan is therefore suggested. The W.C. meeting is held 2-3 times a year. The President, immediate past president, Vice-President, the General Secretary, Treasurer and Editor, who are all ex-officio members and a few other leaders attending the meeting can afford to spend two or three days more and tour round about the place where the W.C. meeting is held. The Provincial or branch Secretary of the place, should make prior arrangements for such visits and prepare the tour programme. Each of the above office-bearers along with one or two other members can very easily and conveniently visit two or three branches nearby and round about. They can also assist the branches in their proper working, advise them to give their considered views on all circulars sent by the Head Office, help them in settling disputes, if any, suggest them to form new branches in their neighbourhood, get subscribers for "Your Health", collect money for building and so on. If such a programme is fixed up beforehand, the six above mentioned office-bearers alone could visit 12 to 18 branches within a radius of 50 to 100 miles at each W.C. meeting or 36 to 54 branches during the year, without entailing much of their valuable time or extra expenses to the Association. This experiment deserves to be tried. I am etc.

Bombay. (DR.) U. B. NARAYANRAO.

I.M.A. Membership Drive

SIR,—With reference to the frequent complaints about doctors not coming forward to join the I.M.A., may I put in the following suggestions to mend matters.

1. Power politics should be given no place in the association matters.
2. A chance should be given to other than the residents of any particular province for the different

posts in the I.M.A. In fact some sort of encouragement should be given to them.

3. A part-time paid secretary should be appointed.
4. Those in authority should lend their ears to complaints from whatever source they come.
5. A membership week should be organised at least once every six months. I am etc.

Calcutta. (Dr.) K. K. Bajaj.

REVIEWS

Extensile Exposure—By Arnold K. Henry, M.B., M.C.H., F.R.C.S.I. Second edition, 1957; board-bound, 10″×7¼″, 320 pages with 298 illustrations. E. & S. Livingstone Ltd., Edinburgh and London. Price 45s. net., regd. postage 1s. 11d.

The text of this book is divided into four sections: the upper limb and neck, access at the second left costal arch, the hypogastric route, and the lower limb. In all the various techniques of incision and exposure, the author has kept bone as the core of each exposure. The methods and techniques have been carefully planned, extensively practised and clearly described. The various methods of exposure have been well illustrated throughout the text, and as such, will be of great service to surgeons—young as well as the experienced.

The Student Life—the Philosophy of Sir William Osler—Edited by Richard E. Verney, M.B., F.R.C.P.E., D.R.; with Forewords by John Bruce, E.B.E., T.D., M.B., CH.B., F.R.C.S.ED. and Alec H. Macklin, O.B.E., M.C., T.D., M.D. Published 1957 by E. & A. Livingstone Ltd., Edinburgh and London. Board bound 7½″×5¼″, 214 pages; price 15s. net., regd. postage 1s. 3d.

It has often been found by intelligent persons with power of observation that many students arrive at the university totally unprepared as to how they should conduct their lives in a university atmosphere and with no true conception of the full meaning of university education—the step from school to university very often representing for the young student not only a dramatic change in educational methods, but a revolutionary alteration in his mode of life. It is therefore not very surprising that so many first year students fail to adapt themselves adequately to this new environment and thereby lose many of the advantages of a university education. This little book propounds the philosophy of one of the greatest physicians of all time and one who had a singular sympathy with, and intimate understanding of the problems and responsibilities of the young student. In his day and among his contemporaries Sir William Osler occupied a unique position. But perhaps his most outstanding gift was his capacity for inspiring others with his own enthusiasm for medicine and for its ideals of integrity and service. To him medicine was a high calling; he himself followed it with integrity, with a youthfulness of spirit, a genial love of his fellowmen and a reverence for its great past. Written primarily to meet the needs of the medical student, the contents of this book are applicable to students of other faculties as well. This book will contribute much to help the students in general, and the medical student in particular, to form and practise a healthy philosophical outlook on life's duties.

Spastics in Cheyne Walk—An account of the centre for spastic children, Cheyne Walk, Chelsea. Edited and compiled by Joan Saunders and Marjorie Napier. Published 11th June 1957 by Pitman Medical Publishing Co. Ltd., 45 New Oxford Street, London, W.C. 1. Board bound. Price 20sh. net.

This is an account of the centre for spastic children which was formed to treat children under the age of five years and suffering from cerebral palsy, and started by using the then unoccupied portions of the Cheyne Hospital for Children, which was one of the Chelsea group. This report is very interesting, illuminating and instructive, depicting as it does, the great difficulties that have to be faced in starting a new venture of this kind and also showing that if there is sincere enthusiasm and honest efforts for such humanitarian project, money does not lack and difficulties ultimately do give way. This book should be an inspiration to workers who have similar ventures, either on hand, or in mind.

Psychology and Psychological Medicine for Nurses—By Holman, P. William Heinemann Ltd., London, 1957. Pages 156. Price 10s. 6d. net.

The book has been divided into three parts. The first part deals with the basis of mental health. Here the author has concentrated attention on human development. In connection with the psychopath the author aptly says 'unloved, they have never learnt to love'. Jealousy of a younger child is often the starting point of the trouble of the older child. The child is introduced to group life in the school. He then finds it difficult to leave the shelter of the home and to identify with the group. Puberty and adolescence (teen age period) impose a great strain on boys hence this is the time of the onset of delinquency and mental breakdown. In unhappy people the difference between fantasy and reality is too great. Involution depression is most prominent in the age period of fortyfive and fiftyfive. One of the many sorrows of old people is their uselessness. Part two deals briefly with mental ill-health. In page 109 vitamin B is said to produce a beneficial result on dementia due to alcohol, obviously, the author means B-complex. Nurses now-a-days may be called upon at any time to take care of mentally disturbed and irrational patients. Hence they must be acquainted with the behaviour, i.e., the reactions of patients to illness. Ignorant patients are mightily afraid of what might happen to them in the hospital. The question of rehabilitating a patient to society specially after a long stay in hospital is as difficult. These things have been discussed in part three of the book. Because of the simple style and avoidance of technical terms the book is very suitable for student nurses going to appear in examinations on nursing. They are sure to gather the essential facts of psychology by going through this little book when their curriculum is becoming heavier day by day.

The Adaptation of Recreational Activities for Man –By Veida Barclay, F.C.S.P. Published by G. Bell & Sons Ltd., London. Pages ix plus 154. Price 18s. 6d. net.

The author has very graphically prescribed in a short compass the various stages of exercises through recreation for lower limb injuries. The chapter on Walking and Running is very well written and forms the basic programme on which has been built up various recreational activities. The movement analysis of and the important muscles involved in normal walking have been well brought out. The programme of graded exercise—from non-weight bearing to full-weight bearing—is carefully chalked out. The most important point that has been brought out in the chapter on Vaulting is the 'spring' of the fore-foot, so necessary for graceful walking and running. The more advanced vaults are usually not necessary for moderately active persons but are extremely useful for athletes. The chapters on Football are very good, particularly for cases of foot injuries. The movements of eversion and inversion, dorsiflexion and plantar-flexion can be easily achieved through dribbling a football. Ball-room dancing is hardly applicable to cases in this country.

The book is well illustrated with a nice get-up.

Fieber Unspezifische Abwehrvorgänge Unspezifische Therapie—Von Prof. Dr. F. Hoff, Frankfurt/Main. 1957. IV, 145 Seiten, 36 Abbildungen, 8°, Ganzleinen DM. 16.50

Fever, Unspecific Defence Mechanisms, Unspecific Therapy—By Prof. Dr. Ferdinand Hoff, Director, I. Medical University Clinic, Frankfurt/Main (in German), IV, 145 pp., 36 illustr., Georg Thieme, Stuttgart, 1957, DM 16.50.

This slim volume presents a thought-provoking survey of the subjects indicated in the title on which the author, a leading German internist, has been working for the last 35 years. Unspecific defence processes, of which fever is the best known, have occupied medical thinking since antiquity, although they were eclipsed for some time by our pre-occupation with the spectacular effects of sulpha drugs and antibiotics. Nevertheless, methods of unspecific therapy are still in use. New discoveries, such as the pyrogenic lipopolysaccharides (Westphal *et al*, 1954), that produce fever in fractions of gamma doses, properdine which explains unspecific bactericidal effects, and newer insights into nervous regulating mechanisms of immunological processes, fully justify such a monographic treatment.

After a historical introduction that shows which great importance already Parmenides and Hippocrates (5th century B.C.) ascribed to fever, and duly acknowledges the decisive discoveries of P. Saxl, R. Schmidt and J. v. Wagner-Jauregg (1915-17), old Austrians all of them, the author discusses fever and unspecific defence mechanisms; the vegetative "total switch-over"; the role of the nervous system in unspecific defence reactions; Selye's adaptation syndrome and Cannon's emergency reactions; endogenous leucopoetines and pyrogens; the part played by leucocytes; bactericidal effects and the properdine system; fibrinolysis, alteration of ferment activities and unspecific defence; relations to local inflammation; unspecific resistance, promunity and immunity, and, finally, unspecific therapy in medical practice; a detailed summary concludes the book. The references are so incomplete that not even Saxl's pioneer paper, the first report on milk injections in literature, has been included. This is a timely and fairly successful attempt to correlate the theory of unspecific immunological reactions with the practice of unspecific therapy.

OBITUARIES

Dr. S. C. Chakraborty

Dr. Sudhir Chandra Chakraborty was born on December 9, 1910, in a village in the district of Pabna in East Bengal (now Pakistan). After passing the Matriculation examination he took up L.M.F. course in Jackson Medical School at Jalpaiguri and passed out very creditably. Till his death on 20-1-58, he practised at Backwore in the district of Monghyr.

DR. S. C. CHAKRBORTY

He was an active member of I.M.A. and was the president of the Begusarai Branch in 1956-57. He was a very popular physician.

Dr. A. Choudhari

The funeral took place on Tuesday, 4th February, 1958 at Barkingside Essex near London of Dr. A. Choudhuri. He was 54. Dr. Choudhari died of a heart attack on January 31. He had practised for 15 years.

About 3,000 patients attended the funeral and hundreds of patients called at his surgery to pay respects.

He was known as a true friend of mankind in London.

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IX MADHYA PRADESH PROVINCIAL MEDICAL CONFERENCE, JABALPUR, 1958

The 9th Madhya Pradesh Provincial Medical Conference was held on 21—23 February, 1958. Dr. H. V. Pataskar, Governor of Madhya Pradesh, inaugurated the Conference, Dr. C. S. Patel (of Bombay), President, Indian Medical Council, inaugurated the scientific session and Dr. K. K. Datey, Cardiologist of Bombay, opened the exhibition.

In the Scientific Session Dr. K. K. Datey of Bombay spoke on Recent Advances in Cardiology; Dr. W. Grillmayr of Colombo on Diagnosis and Treatment of Syphilis; Dr. R. Nigam of Nagpur on Aortography, and Dr. R. P. Chari of Jabalpur on Acute Abdomen.

Besides these, Dr. Udani and Dr. Tibrewala from Bombay and Dr. K. L. Chopra, Dr. A. K. Maitra, Dr. S. C. Barat, Dr. G. K. Gan, Dr. P. N. Pradhan, Dr. T. P. Neogi, Dr. F. W. Correa, Dr. I. B. Goel, Dr. M. S. Dube, Dr. K. D. Koshal, Dr. M. P. Mishra, Dr. P. N. Wahi and Dr. S. L. Goswami also read interesting papers.

About 250 doctors from old as well as new Madhya Pradesh attended the conference.

Dr. R. P. Dube in according welcome to the guests and delegates said: "I may now mention a few facts for the immediate consideration and implementation by the Government. I know our Chief Minister has appointed an Integration Committee but I wonder when its findings will be implemented. There are four Medical Colleges in our State and there is a demand for a fifth one at Raipur. May I with due respect, to the State Medical Department, point out that although they are keen to open new colleges they forget to see that the present ones function properly and that they are properly equipped with men, material and buildings, that at least the pay of the medical people serving in the various colleges is on the same scale and that, they are paid regularly and that, conditions are attractive for the proper type of people to come and join the staff of these colleges.

"Unless all these things are done and done with earnestness and with least possible delay, I do not think that really good and well qualified men will come out of our institutions. Makeshift arrangements will not do. We want that really good and well qualified people should pass out of our colleges. These people have to deal with human lives and not cattle. A new law graduate can make a mistake and lose a case in the lower court and it can be appealed. There is no appeal for the mistakes of a medical man because it will cost a patient's life. It is no fault of the new medical man—he has not been given proper training."

Dr. G. K. Gan, the president of the conference in his address said:

"Modern scientific physician to my mind is the man who can determine causes of illness, anticipate the outcome of an epidemic, combat preventable diseases and thus help to change the outlook and destiny of a nation. His job is to organise a healthy life and contribute to the healthy existence of mankind and not merely to try to cure the sick and relieve suffering but to prevent illness in society and help to re-adjustment in that society.

No one is so linked with the problems of human life as doctors. To nobody the heart of humanity or the homes of people are so freely open and where they are so eagerly welcome, as doctors. So the doctors know the dire needs and problems of people as none else. We doctors working among the depths of human suffering are capable of voicing many a problems of health, that come closest to our people.

Public Health

Every day we are acquiring greater insight into the different problems of public health and hygiene. Modern public health measures should have the following five objectives in view:

(1) Maintenance of health by sound education.

(2) Prevention of diseases by different health services for community as a whole (including pregnant mothers and children).

(3) Establishment of different services for individual diseases and for tackling of epidemics.

Dr. R. P. Dube
Chairman of the Reception Committee

(4) Rehabilitation.
(5) Last but not the least, protecting the health of the aged and the crippled.

We should endeavour to overcome illness by preventive measures which are cheaper in the long run than actually curative methods during illness.

Rural Medical Aid

The problem of rural medical relief is one which has to be tackled realistically and on an attractive basis.

The Rural Medical services planned by Government will only succeed if they allow compensatory facilities to medical men expected to settle down in villages. A medical graduate expects a living wage in keeping with rural surroundings, facilities to educate his children, proper accommodation and opportunity for refresher courses and full scope for their talent and professional knowledge. We congratulate the Government for starting Community Projects in rural areas where not only medical aid but every aspect of human need is being planned to be met. There are a few well managed societies in our State with money and young men at their command who can easily divert their energies in setting up full-fledged rural health centres just like missionaries of other countries. I am confident some of our young graduates in profession would be too willing to help them in their enterprise.

In the 2nd Five Year Plan for the future health for both rural and urban areas, the State Government has not thought it worthwhile to consult the Indian Medical Association. They only consult the Association when free medical services of practitioners are required.

Hony. System in Hospitals and Teaching Institutions

Appointing honorary physicians, surgeons and other specialists to hospitals and teaching institutions has been in practice in Western countries and in many parts of India. We had in our State the hony. system of Medical Officers but it has been partially discontinued. In our teaching institutions we have no such provision for appointing hony. staff. No other profession but the medical willingly offer hony. services. It is a national asset to keep the knowledge of the doctors up-to-date. The honorary system serves a dual purpose, it saves institutions a good deal of money and enables the institution to offer better service; on the other hand, it offers opportunities to large number of doctors to acquire more knowledge and skill which can be utilised by large section of the public. Such hony. workers specialised in various branches could be utilised in camp service and emergencies like epidemics, war, etc.

Health Insurance

The health insurance scheme, started in our State in some big towns, offers a practical solution to the problem of medical relief for the workers. The scheme in our state is being worked by service doctors only. Without mobilisation of private practitioners Government can never implement this scheme fully. The scheme for the present is available for families of workers. The final stipulated goal is to cover the entire population under the scheme as it is in United Kingdom. One of the greatest drawbacks in the Health Insurance Scheme envisaged for the entire population, is that medical men and women working entirely for the scheme are apt to lose all incentive and enthusiasm for further improvement of their medical knowledge and working. The medical profession of United Kingdom has begun to realise the drawback and, may be, in the near future the Health Insurance Scheme introduced in the United Kingdom in the present form may have to be modified.

I think many a wrong in medical practice could be compensated if only we try to understand and appreciate the patient's state of mind and his physical suffering which needs a few kind words of sympathy which will relieve half of his ailments. I am confident this cannot be made available and probably impossible as at present in public health.

If a nation has to function well it requires healthy citizens. If this concept is true, it follows that medical aid be made available to all citizens at minimum cost or to put it to the generosity of the Government at no cost.

Medical Education

It has been definitely accepted that the present system of medical education does not keep pace with the medical needs of the people in the modern times. Fresh graduates after a period of internship go out to work as general practitioners to the houses of people, under most trying conditions with little or no facilities for modern diagnostic equipment except their wit, knowledge and understanding of the patient as a whole. Most of our students do not know properly the conditions prevailing in our villages. While treating a patient in out-stations they have to deal with the whole environment of a patient, his financial factor, his home surroundings, his status and other things. Our students are only taught the organs and systems they have to tackle and the common man they have to treat is ignored. Unfortunately the above facts are not taken into consideration during training.

Moreover in hospitals and teaching institutions cases are invariably admitted in the later stages of an ailment and students are less familiar with the early premonitory signs and symptoms of most common diseases. Thus my young friends find difficulties to cope with their profession in their early days of general practice. Most of the graduates are not going to specialise or take up service. Majority of them go in for general practice. It is realised that a general practitioner is the king pin of medical practice and a specialist is consulted only where it is considered necessary.

The authorities should find ways and means to train the students to be fit to carry out their independent profession with ease and dexterity. It is to the advantage of the students and the State to mobilise the services of experienced physicians and surgeons and other specialists in private practice as hony. teaching medical officers in our teaching institutions. They will impart experienced knowledge which will enable students to conduct themselves sufficiently in their future independent practice. These senior men will contribute a wealth of knowledge and a practical side of medicine which no doctor in government service can ever be able to contribute.

Looking to the present need of our country, specially of rural areas, general practitioners trained and taught under experienced independent medical men are needed.

The Nagpur Medical College has started post-graduate training in the Medical College for M.D., M.S. and other post-graduate degrees and diplomas, but have not made provision for adequate staff to coach and guide the post-graduate students. If they have no funds to provide for adequate staff for post-graduate teaching it is better that they discontinue the post-graduate training till such time they have proper staff. It is no use starting post-graduate courses in a haphazard way resulting in a number of failures year after year. This is a sheer waste of time, money and energy of our young graduates.

I would like to refer briefly to the conditions for admission of students to our State Medical College. As in other countries only those should be admitted who have real vocational aptitude and calling for the profession and at the same time adequate qualifications and intellicence. It is all right to give representation for a small number of the under-privileged and less qualified students but to go on filling our institutions with them indefinitely, is but reducing our institutions to mockery. Failing to admit the right type of students will flood the country in course of time with inferior type of medical men who may not be suitable for research work and other specialised duties. So admission should therefore be given to deserving candidates.

Medical knowledge is progressing in leaps and bounds during the last 15 years and it is difficult for a medical practitioner to keep himself up-to-date. I request our teaching institutions to start short post-graduate refresher courses for all registered medical practitioners and other specialities if required on small payment.

Spirituous Preparations

Whereas general practitioners have to obtain a licence to stock spirituous preparations for their patients' legitimate use and whereas they are required to keep account of stocks, being classed as dealers in medicine, hundreds of lbs. of tinctures, so called alcoholic tonics, poisonous illicit distilled liquor and other alcoholic beverages are allowed to be sold openly, which are ruining the health of the people. The evil of illicit distillation and sale of obnoxious alcoholic tonic intoxicants, which is flourishing as a major industry in our State must be stopped at once. Medical practitioners by virtue of their registration are entitled to use and stock poisonous and spirituous drugs. Unnecessary restrictions to stock these drugs ought not to be imposed as they act as hindrances in carrying out day-to-day work and further lower the dignity of the medical profession. If there is any misuse by the profession there is the Medical Council to take drastic steps against the registered medical practitioner. I would request the authorities concerned to amend the existing rules sooner the better.

Tuberculosis

This is an era of opening up of tuberculosis hospitals, out-patients departments, door to door advisory T.B. services, mass chest radiography, sanatoria, after-care tubercular colonies and so on. This all is being done because we know with confidence, that the disease is both preventable and curable. B.C.G. vaccination introduced in all States is effective without risk of disease from the vaccine itself. B.C.G. is but one of the satisfactory measures for control of tubercular infection. We are practically tackling this problem of tuberculosis in our State from all fronts, such as improvement in living conditions, prevention of contagion, isolation and treatment of contacts, treatment of diagnosed cases even at the cost of the State, public organisations to combat the disease and so on. We congratulate the W.H.O. and the Tuberculosis Association of India on their great work in the cause of the fight against tuberculosis in India.

Child Health

Out of the whole population of India about 40 per cent are children under 15 years of age. No other country in the world except China, has to deal with such a huge child population. Of this about 75 per cent is scattered in rural areas where the conditions of medical relief are inadequate.

More of our energy and time are however spent in considering questions and tackling problems relating to adults only. The divisions of our time appear to be not in proportion considering the great importance of children's welfare. The children are a nation in the making and time and resources devoted to their development and improvement are worth more than any other scheme. Unfortunately most of our children are underfed, under-nourished, ill clad, badly housed, and therefore physically underdeveloped.

There should be a chain of institutions in our State for the welfare of children, e.g., child welfare centres, sufficient number of separate beds for sick school and college boys in public hospitals, compulsory mid-day meal system in schools, well baby clinics, school children's periodical health examinations, last but not the least qualified paediatricians to look after the ailing children. Infant mortality in our State is more than 130 per thousand which could be reduced considerably if the maternity homes and other female hospitals share the responsibility of neonatal care with having qualified paediatricians on their staff.

Dr. G. K. Gan
The President of the Conference

Most of us believe that the welfare of children is the responsibility of the family. Of course the family always gives its best for children but the State has to step in and support the family in its efforts. It is gratifying to note that the welfare of children is receiving country-wide attention during the last few years and so also in our State.

The bulk of the work in medical relief is done by the general practitioners and it is the duty of the State to train these practitioners to tackle efficiently children's ailments and diseases which are peculiar to the age groups.

I earnestly request our Government to provide proper facilities for adequate training in children's diseases in teaching institutions of our State and make it a part of the subject of medicine for final M.B.B.S. examination.

Family Planning

This is a very difficult problem but every one today admits that there is a great disparity between family increase and environments and on the grounds of economics and health, family planning is necessary. Educated people are to some extent aware of family planning methods, but it is in rural areas and among the uneducated and poor section of the people in urban areas that the family planning is most necessary. The tempo of family planning can be speeded up if the co-operation of medical men and women all over the country is sought and utilised and a large number of married lady workers mobilised in this campaign.

Nutrition

Reduction of prices of foodstuffs is most urgently needed because prices have gone so high, that they are prohibitive for an average man. There is very great danger of the health of our people rapidly deteriorating and diseases due to undernourishment taking up epidemic form. The whole question of malnutrition, its im-

DR. R. N. CHATTERJEE
ORGANISING SECRETARY, RECEPTION COMMITTEE

mediate effects and ultimate results are far-reaching and important in modern life. It is of special interest to those who are striving for solution of vast problem of making a better generation. It is absolutely essential that the new generation should not only be healthy but of good physique and mental calibre. The problem of nutrition therefore is not alone a medical problem but an economic and political one as well.

PHARMACEUTICAL DRUGS

A word for our pharmaceutical firms taking part in our exhibition organised by this conference. In the past the pharmaceutical industries of our country specially of scientific drugs, consisted mostly of "bottlers and processors'. But of late our pharmaceutical firms are manufacturing basic intermediaries required for drug and chemical industries to cover a large number of synthetic drugs, antibiotics, alkaloids and vitamins. In our State the pharmaceutical industry has not been taken up as yet. It is in the interest of our State and larger interest of our country to be self-sufficient. Enormous sums of money are being spent on imported drugs, some of which can easily be manufactured in our country. At the same time we must see that the quality of production and its proper standardisation is maintained. In the last few years we have come across drugs of number of firms flooding the market with similar composition. I personally think that instead of a number of firms manufacturing the same sort of drugs and medicines and competing among themselves, they should unite and form bigger pharmaceutical firms so that they can manufacture better standardised products and thus lessen the drain of our resources spent on purchasing medicines from other countries.

MEDICAL PROGRESS IN OUR STATE

We in our State are trying to eliminate many infections and other diseases such as malaria, leprosy, filariasis, yaws, smallpox, tuberculosis etc., by organised efforts of prevention and treatment and we have been able to do a lot. Private enterprise with State co-operation should shoulder the task of reorganising State health problems. We have to catch up with the advanced countries and we cannot sit silent and indefinitely for fulfilment of our aims. It is therefore the duty of this Association and the State to force the pace of progress.

OUR ASSOCIATION

No medical man however highly placed in service or profession can afford to remain aloof in these days of socialistic pattern of society. Our I.M.A. has been in existence for over 28 years and during the period it is continuously trying to justify its existence.

For the fulfilment and the solution of common problems and needs we have to get together. There are times when we have to voice with one accord our opinion or criticism of Government policies and we do grant that our fellow workers in service cannot in the fitness of things associate in this. But for pooling knowledge and sharing of common problems we have to get together. The progress of medicine and medical aid depends on our becoming more and more a live organisation to make our voice felt in the medical affairs of the nation. We have to work together and to work against one another. Then and not till then shall we be recognised as members of a noble profession."

* * * * *

The following resolutions were passed at the conference :

1. Resolved that the system of appointing Hony. Medical Officers with adequate qualifications be re-introduced in the Government Hospitals and Teaching Institutions of the State.

2. The rules regarding the stock and use of spirituous preparations by Registered Medical practitioners be amended.

3. The grave menace of quackery should be abolished by acts of legislation to prevent lay and simple people to be misguided.

4. State and Central Governments be requested to seriously consider our resolutions passed in the open session.

5. This Conference notes with great regret the unsatisfactory method at present adopted for the selection of students for admission to the various medical colleges in the M.P. State. In the opinion of this Conference, the only criterion for admission should be his whole academic career and the marks obtained by a candidate at I.Sc. examination. The Conference is also of opinion that it is now high time that the special privileges for admission hitherto granted to "political sufferers" be withdrawn.

6. This Conference requests the State Government that the list of the students who have been selected for admission to the medical colleges together with total calculated marks obtained by them should be displayed on the Notice Board for students and their guardians who have applied for admission.

7. This Conference resolves that the practice of reimbursement of medical expenses to Government servants should be withdrawn and instead request the Government, both State and Central, to grant suitable allowance towards the medical expenses.

BRANCH NOTE

BENGAL PROVINCIAL BRANCH—The report for the year ended on 30-9-57 shows that 3 ordinary meetings of the Provincial Council and 8 ordinary meetings of the Working Committee besides Special meetings and 1 joint meeting with the Executive Committee of the Calcutta Branch were held during the year. Details of the activities of the branch for the year are also reported. The branch thanks Messrs. Pal & Roy for auditing the accounts, Messrs. East India Pharmaceutical Works for entertaining the secretaries of the branches and Messrs. Standard Pharmaceutical Works for printing the Annual Report.

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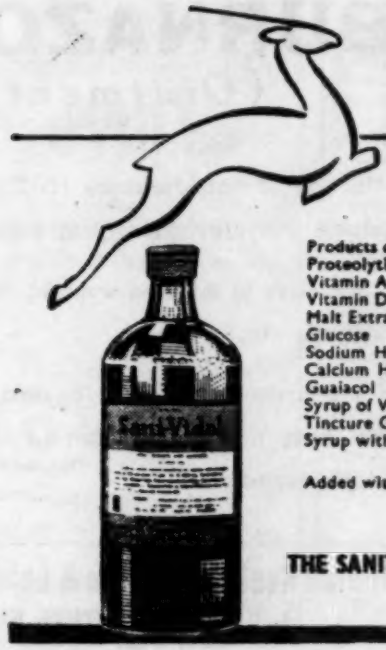

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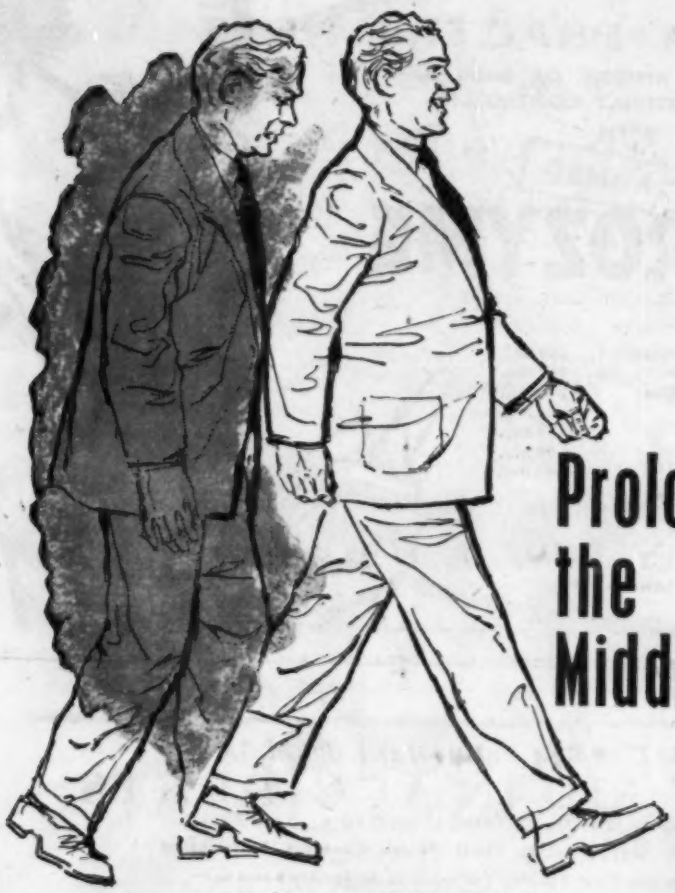

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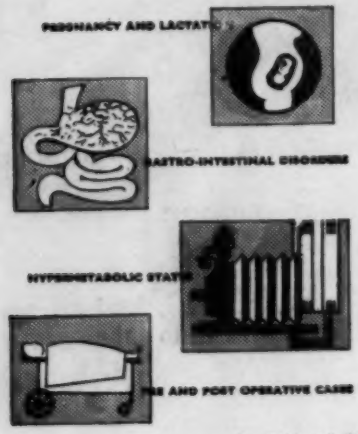

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